VARICOCELE

AND ITS

TREATMENT

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WITH ILLUSTRATIONS

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TO THE

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IN TESTIMONY

OF APPRECIATION OF THE HIGH SCIENTIFIC ABILITY AND KINDLY FRATERNAL COURTESY OF THE REPRESENTATIVES OF THE MEDICAL "NEW SOUTH," AND AS AN ASSURANCE OF THE WARM REGARD OF A NORTHERN DOCTOR, THIS MONOGRAPH IS RESPECTFULLY INSCRIBED BY THE AUTHOR.

PREFACE.

In this Monograph an attempt has been made to present in a concise and at the same time in a comprehensive manner a review of the subject of varicocele and its treatment. Aside from the excellent little work of Mr. W. H. Bennett there is no comprehensive treatise upon the subject. Mr. Bennett's work is practically a presentation of his own views and method of operation alone, and by no means professes to present a complete survey of the field. In the present monograph no attempt has been made to consume paper by verbose padding, the salient points being kept in view. The chapter upon Operative Methods comprises in substance a paper presented to the Southern Surgical and Gynæcological Association and published in its Transactions for the year 1890. It is to be regretted that the excellent discussion which the paper brought out cannot be introduced into this Monograph.

Opera House Block,
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VARICOCELE AND ITS TREATMENT.

CHAPTER I.

Definition and General Considerations.

Varicocele, in a general way, may be said to be one of the most frequent surgical diseases of the male genito-urinary apparatus. If, however, we take into consideration only those instances in which the disease is sufficiently marked to demand the attention of the surgeon, the number of cases is greatly reduced.

Varicocele is not an intrinsically serious affection, but from certain circumstances peculiar to its location and the importance of the function of the involved part, there is nevertheless a fair proportion of cases in which the patient sooner or later consults the surgeon. There are few diseases of so mild a character *per se* that are capable of causing so much annoyance to the patient as is varicocele. To be sure the annoyance is more often of a mental than physical character, but to my mind this very fact is a warrant for more careful consideration than is usually accorded it. It is not every patient whom we can convince that the condition is a very trifling matter.

In some cases there are urgent physical reasons for most careful consideration of the disease.

Varicocele consists of a dilatation of, with accompanying structural changes in, the walls of the plexus of veins surrounding the spermatic cord. These changes are the same as those which occur in varix in other situations; the causes

being also essentially the same if we exclude masturbation and sexual excesses.

After a time the veins become distorted and bent upon themselves here and there. This, with a notable increase in their diameter, results in the formation of knots or varicosities, true blood sacs more or less extensive which remain in communication with the main vessel, bearing the same relation to the vein that some aneurisms do to the vessel from which they are derived. Beginning at the testicle, the superior border of which they conceal to a greater or less extent, the tortuous veins ascend along the cord, enter the inguinal canal and finally enter the left renal vein or vena cava, according to the side affected. Quite frequently, the veins which accompany the vas deferens become elongated and descend below the upper border of the testicle, forming a soft mass in front of this organ.

The term varicocele is not very definite, inasmuch as it literally implies a varicose enlargement of the veins in any situation. Etymologically, the inaccuracy of the nomenclature of the special form of varicocity under consideration, is quite evident.

The word varicocele (fr. varix=a dilated vein+*κηλη*= a tumor) is an awkward but convenient hybrid. Cirsocele (incorrectly circocele *κιρσος*=a varix+*κηλη*=a tumor) is more elegant and perhaps more correct, but is almost obsolete. Both words from an etymological standpoint signify a varicose swelling in any portion of the body, but clinical usage has restricted them to the scrotal region. Pott suggested the term cirsocele for varicose veins in the scrotum, and varicocele for a similar condition of the veins of the spermatic cord, but at the present day the former term is rarely met with in English medical works or periodicals.[1]

[1] Monod and Terrillon reverse these terms. Thus, these authors say that, according to the exact signification of the words, varicocele should be applied to varicose veins of the scrotum, and cirsocele to those of the spermatic cord.

Frequency of Varicocele.

The frequency of varicocele is a matter of some doubt, statistics varying greatly. The wide variation in estimates is doubtless due to the varying interpretation of the term *varicocele* by different observers, and to the varying classes among whom the observations are made. Landouzy, an old French writer, put the proportion of cases at sixty per cent. of adult males.[2]

This is undoubtedly an exaggeration due to the classification of the slighter forms of dilatation of the spermatic veins as varicocele.

Henry found but forty-one cases in nearly two thousand men examined for the New York police force.[3] This record is, however, not an accurate criterion of the frequency of varicocele, as applicants for the metropolitan police force are exceptionally vigorous, and by no means the class predisposed to the disease. My own observations, comprising a large number of life insurance examinations, as well as a large number of patients seen in private and dispensary practice, show that not to exceed five per cent. of male adults have varicocele, of even moderate dimensions. The proportion of cases which are marked enough to cause definite symptoms is even smaller.

Varicocele tends to diminish in frequency with advancing age. M. Horteloup, surgeon to the Bicétre,[4] found 42 subjects with varicocele among 1,600 individuals, and of these, 16 had developed before the age of twenty-five. Of the total number of cases 14 increased, 19 remained stationary, 8 diminished and 1 entirely disappeared at the age of 45. Of the cases which appeared before the age of 25, 11 increased or remained stationary, 4 diminished and 1 disappeared. These figures show that while varicocele does not necessarily progress, an increase is to be anticipated in

[2] "Du varicocèle et en particulier de la cure radicale de cette affection."

[3] "The treatment of varicocele," 1889.

[4] Memoire á l'Acad. inedit.

a fair proportion of cases. The prognosis is rendered more favorable, however, if we consider the class of patients on whom these observations were made. The occupants and out-patients of the Bicetré are nearly all engaged in hard manual labor. As Horteloup remarks in connection with the indications for treatment, the surgeon must be guided in his practice by the social status of the patient. Palliation may effectually prevent increase of the varicocele in the wealthier class of patients, yet prove ineffectual among laborers and those subjected to prolonged standing. Vidal has laid especial stress upon this point:

Bennett has formulated his conclusions as to the frequency of varicocele as follows:

"Taking into consideration all classes of subjects, it may safely be said that not more than five or six per cent. have sufficient enlargement of the spermatic veins to justify the term varicocele.

"This percentage is less than that noted by some previous observers, the difference being apparently due to the fact, already mentioned, that I confine the term to well-marked cases.

"The percentage of subjects presenting slight, temporary or permanent fullness or tortuosity is much greater. With reference to this point, it is especially important to remember that the fact of the veins on the left side being merely larger than those on the right, although the difference may be considerable, does not necessarily indicate the existence of varicocele, since the veins on the two sides are so frequently unequal in size.

"Of subjects affected with varicocele, properly so-called, nearly fifty per cent. are unaware of its existence until it has been pointed out to them or has been discovered accidentally.

"Only twenty per cent. of the gross number of varicoceles give rise to any noticeable symptoms, and of the cases known to the patients treatment is sought in twenty-five per cent.,

approximately. This last percentage may be raised to something like forty-five by persons applying for operation, in consequence of rejection or prospect of rejection for the public service.

"The number of cases coming under observation in feeble and lymphatic subjects is much greater than in the strong and robust (excluding those who apply for advice from curiosity, or in connection with the requirements of the public services), although the tendency to the affection, as shown by slight abnormal fullness of the veins, appears to be about equal in the two classes.

"The actual excess of these cases in the feeble and lymphatic is forty-five per cent. or thereabouts, but it is necessary to note that the feeble and nervous class of subjects seek treatment for much slighter reasons than the robust. Hence the mere excess in the number of cases causing symptoms in this class is really no evidence of the actual existence of a greater number of varicoceles, as such, in men of this kind."

With a view to ascertaining, as accurately as was practicable, the exact proportion of varicoceles occurring in the two classes of subjects referred to, Bennett examined, 1. A series of three hundred robust patients admitted into St. George's Hospital for injuries or unimportant surgical diseases: *e. g.* fractures, innocent tumors, etc.; and 2. A series of three hundred patients who were feeble, or naturally lymphatic, admitted for reasons similar to those just mentioned, and not exhausted by organic disease or long-continued illness. The result will be seen in the following table which does not include any patient admitted for varicocele or other affection of the genito-urinary system.

The author states that the small excess in the number of cases of slightly abnormal fullness of the veins found in the feeble and lymphatic subjects is probably accounted for by the fact that in them the flabbiness of the scrotum allowed the vessels to be more easily felt, and does not, therefore,

necessarily indicate any actual preponderance of full veins in this class of subjects.

TABLE SHOWING THE NUMBER OF CASES OF VARICOCELE FOUND IN A SERIES OF SIX HUNDRED HEALTHY SUBJECTS EXAMINED: *a*, ROBUST; *b*, FEEBLE OR LYMPHATIC.

	Total number of subjects examined.	Cases in which slight abnormal fullness of the spermatic veins existed on one or both sides.	Cases in which the veins were sufficiently large to constitute varicocele.	Cases in which the patients were aware of the existence of varicocele.	Cases in which the varicocele had caused any noticeable symptoms.	Cases in which treatment had been sought.
a Robust.....	300	36	15	5	2	0
b Lymphatic or Feeble	300	40	28	18	8	5
Total cases in the two classes	600	76	43	23	10	5

The comparative infrequency of right-sided varicocele is demonstrated quite forcibly by Bennett's examination of a large number of cases. He found that in 100 consecutive cases examined, the varicocele involved the left side only in 80, the right side only in 1, and both sides in the remaining 19. He concludes, therefore, that instances in which the right side is alone affected are so rare as to be hardly worthy our attention, excepting as curiosities. He has seen two other cases limited to the right side, but his experience in this respect appears to be exceptional so far as recorded cases are concerned. Breschet, who in the early part of the present century probably had as large an experience of varicocele as any surgeon of his own day or even later, stated that he never saw an example in which the right side alone was affected. Furthermore, while in the more

modern literature of the subject mention is made of possible limitation of varicocele to the right side, no authentic cases actually observed are reported.

CHAPTER II.

Anatomical Characters of Varicocele.

Varicocele is more frequent than varices elsewhere from the fact that there exists not only general but also special causes of venous dilatation due to local anatomical conditions. The veins forming the pampiniform plexus are relatively large, and follow a devious course along the spermatic cord, and surrounding this structure; the vessels of this plexus frequently anastomose, The valves of these vessels are few in number, very defective and yield to the downward pressure of injected fluid very readily. As compared with the veins in other locations those of the pampiniform plexus are poorly supported by connective tissue, which is in this situation sparse, loose and inelastic. The spermatic veins are very long, and independently of defective valves there is a marked tendency to yielding of the illy-supported venous walls to the weight of the long column of blood which flows so nearly perpendicularly upward. Pressure upon the veins as they traverse the inguinal canal tends to enhance the prospect of varicocele. Strains of the abdominal wall and especially those involved in difficult defecation are likely to bring this about.

The anatomy of the parts involved in varicocele is a very important consideration and one which is ignored by most anatomical writers. Quain's description is probably the best of any in the ordinary text-books and I will therefore reproduce it.[1]

[1] Quain's Anatomy.

The spermatic veins proceed upwards from the testicle and epididymis, and form in the spermatic cord a thick plexus of convoluted vessels, known as the spermatic, or pampiniform plexus. Passing through the inguinal canal in the abdomen, in company with the spermatic artery, the branches from this plexus join in two or three veins, and these again unite into a single vessel which ascends beneath the peritoneum on the surface of the psoas muscle, and opens on the right side into the vena cava, and on the left into the renal vein. The spermatic veins sometimes bifurcate before their termination, and, in this case, one branch may enter the vena cava, and the other the renal vein. Mr. Bennett[2] calls attention to a number of other details regarding this plexus as follows:

"*a.* The left vein is always longer and larger than the right; moreover, it receives one or more (generally two) branches from the descending colon. These colico-spermatic branches which communicate with the radicles of the portal system, vary greatly in size in different individuals, being in some cases very small, and in others so large that their combined calibre exceeds considerably that of the spermatic vein itself. These branches are normally entirely confined to the left side, the right vein being without tributaries, excepting a branch from the ureter which is found on both sides.

"*b.* The junction of the two, three, or more branches proceeding from the pampiniform plexus to form the spermatic vein may take place at any point between the level of the external abdominal ring below and the middle of the iliac crest above, the commonest situation being either just below the upper end of the inguinal canal, or immediately inside the abdomen above the internal abdominal ring.

"*c.* The pampiniform plexus is for practical purposes divided into two distinct portions, an upper and a lower, by a central complicated plexiform arrangement; above and

[2] Op cit.

below this, although the veins communicate with each other, the arrangement is in many cases hardly sufficiently intricate to justify the use of the term plexus.

"*d.* The valves in the plexus and veins are uncertain in number and situation. They may be absent altogether, or may be very numerous. They may exist in great numbers in the plexus, and be absent in the spermatic veins, or *vice versa.* Under all ordinary circumstances they are more constant in occurrence and more numerous in the central plexiform arrangement, to which reference has been made. In the spermatic veins there is usually a valve at the junction with the renal. This valve is more frequently absent on the left side than on the right; its absence on the left may or may not be associated with a more or less complete valve in the renal vein.

"However numerous and competent the valves may be, they tend to become incompetent, as a rule, in subjects over sixty years of age. The defect thus arising is followed by slight enlargment of the veins below the level of the insufficient valves. The tendency to insufficiency in the vein valves of elderly people is not, of course, peculiar to this region, but occurs in the majority of long veins, notably the internal saphena.

"Abnormalities are rare on the right side, but comparatively common on the left. Setting aside the variation in the level of junction of the efferents of the pampiniform plexus, which hardly comes under the head of abnormality, the left vein was found in two hundred cases examined to present some distinct abnormality in nearly twenty-five per cent.; whilst on the right side the percentage was not more than five. Again, on the right side the abnormalities were trivial, consisting, with two exceptions, of bifurcation of the vein high up, both branches then running into the vena cava. The exceptions were: (1) a case in which there passed from the spermatic vein about its middle to join the renal a thin fibrous cord, small and not perceptibly pervious; in the renal vein

was a fairly formed valve; and it is interesting to note that in two of the other instances of bifurcation there was evidence of the existence of an imperfect valve in the renal vein. (2) A case in which the right spermatic vein opened into the renal, and was considerably more than double the size of the left, having also opening into it large colico-spermatic branches, which were entirely absent on the left side. The veins of the pampiniform plexus were altogether larger throughout than on the opposite side. The ureter was double on the right side, but natural on the left. I have recently met with another case showing the same abnormal arrangement, which amounts in fact to a transposition of the right and left spermatic veins. Here, again, the ureter was double on the right side, a point which seems to indicate, as it were, some excess of developmental eccentricity in the production of this abnormality.

"The abnormalities on the left side were roughly as follows:

"(*a*) Bifurcation of the spermatic vein before its termination. In most cases one branch opened into the renal, and the other into the vena cava, but in some the two divisions opened into the renal, and in one both ended in the vena cava.

"(*b*) Divisions into three branches (only two examples of this arrangement were seen). In one instance, two of the branches terminated in the vena cava, the second opened into the renal, and the third, very large, joined a vein of considerable size on the back of the colon; in this case the whole spermatic vein was much larger than usual, and there existed an extensive varicocele, the upper end of which extended quite an inch above the internal abdominal ring.

"(*c*) Double vein; both vessels opening into the renal by separate orifices, or joining only at the point of junction with the recipient vein. In a subject recently dissected, the vein being double, one portion went to the vena cava, and the other to the renal, having received just before its ter-

mination a large vein coming down from the region of the spleen.

"(*d*) Vein double about the central portion, single above and below.

"In varicocele the veins are not only larger and more tortuous than normal, but in many cases much more numerous. The relative number of the veins differs greatly in different examples, but, as a rule, varicoceles with very large and manifestly over-tortuous veins have fewer vessels than those in which the swelling is smoother and more compact. The arrangement of the veins differs so much that four distinct varieties of varicocele are recognizable:

"(*a.*) The tortuosity and dilatation involves the whole of the pampiniform plexus and its efferents (Tumor, Class I.), and may, therefore, when the junction of the efferents in forming the spermatic veins takes place at a high level, extend inside the abdomen. This latter statement is directly opposed to the belief of some observers who deny, or have great doubts about, the existence of intra-abdominal varicoceles.

"(*b.*) The varicose conditions may be more particularly limited to the portion of the plexus below the central plexiform arrangement to which I have alluded. In this variety, which is seen clinically in tumors, Class II., the veins in the upper part of the cord, beyond being rather larger than usual, are not abnormal, and this increase of size in some cases is so slight as to escape notice altogether.

"(*c.*) The varicosity may involve more especially the part of the plexus above the central plexiform arrangement extending up to the point of formation of the spermatic vein (Tumor, Class III.), the veins below being full, perhaps more numerous, but not generally much larger than normal. In this variety, the valves in the central plexus are numerous and strong.

"In speaking of the clinical aspects of Tumor III., I have referred to its tendency at later periods of life to

assume the general characteristics of Tumor I., in consequence of the whole pampiniform plexus becoming involved.

"It is not, I think, unfair to assume that the change has some relation to the incompetency which is prone to occur in the valves in the central plexus, in common with those in many other veins, as age advances.

"(*d.*) The whole pampiniform plexus and spermatic vein may be much larger, more tortuous, and altogether more important than normal. I have dissected two examples of this variety. In each of these the varicose condition was uniform throughout the spermatic venous apparatus. The valves were proportionately large and strong and the vein walls very thick. The vessels themselves were not more numerous than on the opposite side. The subjects were robust men who had died from acute disease, and no trouble had obviously been caused by the abnormal veins. These cases may be regarded, I believe, as examples merely of congenital exaggeration in size of the veins, a view which is strongly supported by the facts that the testicle, in spite of the large size of the lower part of the varicocele, was in each case perfectly natural, and the spermatic artery considerably larger than that on the unaffected side. Similar cases occur in the lower extremities and in other situations, varying in degree from slight exaggerations in size only, to the condition sometimes called diffused venous nævus which may involve a whole limb. As already stated, the veins in varicocele are not only changed in character, but in many cases (probably the majority) increased in number. This increase is most marked in the second of the varieties just described, and is frequently present in the third kind; in the first it is comparatively rarely found, and in the fourth the veins are not more numerous than normal. In all cases the vein walls are thicker than those of normal veins, the thickness bearing a direct proportion to the size of the vessel, a condition which leads to the open-mouth appearance shown by these vessels on section. This unnatural thickness of the vein

wall has been almost universally ascribed to the result of chronic inflammation upon, so far as I can judge, no evidence of any kind. It is much more likely indeed, in my opinion it is certain, that with very few exceptions in which thrombi, etc., have occurred, the thickness is merely the outcome of the same tendency to abnormality which produces the increased size and tortuosity; for it will be found that, however young the subject may be, the veins on the affected side are distinctly not only larger but thicker in structure than natural."

Varicocele in its Relations to Public Service.

Varicocele has been a subject of some importance to military surgeons, especially as regards examinations for enlistment. Landouzy states that of 166,317 men examined in England and Ireland during a series of years, 7.5 per cent. were exempted from service on account of varicocele. The Army Medical Reports of Great Britain are quoted as stating that during the years from 1869 to 1873, of 331,568 men examined, 5,312 were rejected for varicocele.

Sistach, in 1863, asserted that in France eleven per thousand of candidates for enlistment were rejected for varicocele. From 1879 to 1883 the proportion had been reduced to three per thousand. It is claimed that this reduction was due to improved methods of treatment, but this is probably an exaggerated estimate of surgical progress. Horteloup relates a case that was rejected on account of varicocele, in which the candidate was accepted without comment after a successful operation.

Not only in relation to military service is the question of varicocele of importance, but the examination of applicants for positions in the fire and police departments of the municipal service are very rigorous in this regard. I have several times been called upon to operate a varicocele which

has been the cause of rejection of a candidate for public service in these departments.

The following table shows the proportion per thousand of recruits that were rejected for varicocele in the British service in the years from 1878 to 1887.[3]

YEAR.	PRIMARY INSPECTION.				SECONDARY INSPECTION.		TOTAL.		Total number of recruits examined.
	Examined by Army Medical Officers.		Examined by Civil Practitioners.		Examined by Army Medical Officers.		Ratio per 1,000 of Rejections in Total Number of Recruits Examined, Excluding a Small Number Rejected as Unfit within First Three Months of Service.		
	Ratio per 1,000 Rejected.		Ratio per 1,000 Rejected.		Ratio per 1,000 Rejected.				
	Varicocele.	Varix.	Varicocele.	Varix.	Varicocele.	Varix.	Varicocele.	Varix.	
1878	12.01	17.30	12.54	12.80	....	....	13.08	17.96	43.867
1879	12.92	18.10	16.32	17.27	....	....	14.77	19.22	42.668
1880	13.70	15.40	22.54	15.57	....	....	16.09	16.14	46.108
1881	16.23	16.28	14.40	15.06	....	....	16.86	17.20	47.444
1882	16.93	16.43	10.56	12.60	5.60	6.62	16.82	16.97	45.423
1883	16.97	14.89	18.45	13.24	7.40	6.98	18.27	15.80	59.436
1884	13.26	16.63	20.81	12.83	7.71	9.60	15.85	17.69	66.882
1885	15.67	16.62	15.68	12.68	5.92	5.64	16.91	17.03	72.249
1886	15.93	18.00	20.35	12.41	5.27	5.84	17.74	18.14	74.991
1887	13.28	17.79	22.76	14.31	4.62	5.50	15.39	18.11	60.976

With reference to the question of life-insurance, varicocele *per se* is of no importance.

Relative Frequency of Varicocele upon the Right and Left Sides.

Varicocele is most frequent upon the left side, the reasons advanced therefor being: 1. The relatively lower position of the left testis. 2. The relative acuteness of the

[3] Bennett Op. cit.

angle formed by the junction of the left spermatic with the renal vein.[4] 3. The close proximity of the left spermatic vein to the sigmoid flexure of the colon and its consequent exposure to pressure in constipation. 4. The absence of a valve in the left spermatic vein at its junction with the renal. 5. The tendency of men to stand upon the left foot.

It would appear that the relatively greater length of the cord and its attendant vascular structures, with the consequent greater weight of the contained column of blood upon the left as compared with the right side, is an all-sufficient explanation.

Landouzy lays great stress upon the relative frequency of left-sided varicocele. Breschet, in one hundred and twenty varicocele operations found but a single case of right-sided varicocele. Curling records that of 166,317 young men examined for service in England and Ireland within ten years, 3,911 were refused on account of varicocele—a proportion of seventy per thousand;—of these, 282 were on the right, 3,360 on the left, and 269 on both sides.

Petit is of the opinion that the pressure of fecal matter upon the left spermatic veins is the chief determining factor in left-sided varicocele. Osborn is a champion of this idea. The latter, however, attributes great importance to the relatively greater length of the left spermatic veins.

When varicocele is present on the right side, there is almost invariably involvement of the left side also:—indeed, I do not recall a case in which the right side alone was involved. Traumatic causes may, however, give rise to such a condition. The relatively greater frequency of varicocele on the left side was expatiated upon by Celsus: hence there has been plenty of time for an abundant crop of explanations to develop.

[4] Morgagni and Cooper.

CHAPTER III.

Causes of Varicocele.

The causes of varicocele are several: First and most important is a constitutional lack of tone;—this cause is rarely accorded sufficient importance, the tendency being to seek for exclusively local causes. What is termed congenital or hereditary predisposition to varix in general, consists of an inherent lack of muscular and vascular tonicity. The venous walls are especially weak and flabby, and the circulation sluggish. The same causes that produce laxity of the venous walls produce feeble heart action; there is a deficiency in the *vis a tergo* which is so important in propelling the blood through the veins, and also a deficiency in the aspirating power of the heart and lungs. The association of these conditions with varices of the extremities will on reflection be found to be very familiar. These same patients present a special tendency to hemorrhages on account of vaso-motor deficiency, and I have noticed in a general way that the existence of varices of the extremities in patients about to be operated upon is a note of warning as regards possible annoyance from hemorrhage.

Persons who suffer from such diseases as purpura and scurvy are peculiarly liable to relaxed and dilated conditions of the veins. Strumous individuals also present a tendency to varices.

Varices are apt to occur in persons of indolent habits, because of defective circulation as well as a general lack of tone with resulting vascular flabbiness incidental to insufficient exercise. Such persons, who are compelled to stand at

their work for prolonged periods, are peculiarly subject to varicose veins. Certain diseases of the heart, liver, lungs, and peritoneal cavity, which produce by pressure retardation of the return flow through the inferior vena cava and iliac veins, favor the development of varix. Long-standing portal obstruction is liable to produce varicocele in conjunction with hemorrhoids.

Relative to varicocele from intra-abdominal pressure, Guyon has observed some curious cases in which the disease was due to the pressure of a renal tumor. He has encountered this condition of "*varicocèle symtomatique*" three times on the left and three times on the right side.[1]

Relation of Varicocele to Sexual Disturbances.

Masturbation, sexual excesses and prolonged venereal excitement without gratification are undoubtedly responsible for varicocele in many instances. I regard it as highly improbable, however, that these causes, if brought to play for the first time in a healthy adult, would cause varicocele, but occurring as they usually do when tissue development is really in excess as compared with the inherent resisting power of the various structures, they operate very powerfully in producing congestion and finally dilatation of the spermatic plexus.

Mr. Bennett is still more skeptical regarding the causal influence of sexual aberrations, as the following will show:

"The relation of varicocele to sexual irritation, depraved inclinations and practices, does not, so far as I am able to judge from the literature of the subject, appear either to be properly understood, or to have received the attention it merits.

"All the ordinary works dealing with the affection, whether in the form of special treatises or as parts of general

[1] Guyon, Lec. Clin. sur lesmat. des voies urin. Paris, 1881.

systems of surgery, invariably refer to self-abuse and excessive venereal indulgence as causes of varicocele.

"It is, however, perfectly clear, if a moment's thought be given to the question, that it is quite impossible for either of these so-called causes to originate the affection. Personally, I would go further than this, for I have no doubt whatever that the relation is quite the reverse of the commonly accepted view, as it seems to me certain that in those cases of varicocele in which any excessive perversion of sexual habit or inclination exists, the varicocele is the cause and not the result of the sexual irritation.

"It is most difficult to surmise what the reasons could have been which led to the general acceptance of the opposite view, unless the growth of the disease being, as it so often is, coincident with the acquirement of the depraved habit, was misinterpreted as being due to the depraved practices instead of the acquirement of the habit being caused by the irritation of the testicle by the growing varicocele, at a period of life (puberty) when the whole generative system is in a condition easily excited by direct or reflex causes.

"My view, therefore, in relation to this point is that the effect of the growth of the varicocele in these cases, which are fortunately not very common, is to produce an irritation in the generative organs which leads to exaggerated sensitiveness and at times insatiable desire, the rational and only logical treatment of which lies, not in the administration of a multiplicity of drugs or of comprehensive monitions as to the necessity of moral restraint, but in the removal or modification of the source of irritation by the radical treatment of the varicocele by a proper operation; in short, to apply ordinary surgical principles and attempt to remove the cause rather than dally with the result.

"I confess there has always appeared to me a singular want of consistence in the practice of those who, in a case of depraved sexual habit, would not hesitate to recommend the

removal of a redundant prepuce as a possible cause of the irritation, and who would at the same time, under similar circumstances, hardly think of looking for a varicocele at all, and even if aware of its existence would be satisfied with offering advice as to the practice of self-restraint, the possible source of the irritation being left untouched.

"The following is an illustrative case. A youth just under twenty years of age came under treatment with a varicocele, which was rather large and sensitive on pressure. The varicocele had increased very considerably when he was about fifteen years of age, having previously given no trouble, although it had existed as long as he could remember. With the increase of the affection, sexual irritation developed itself, and when applying for relief the following was his account of the matter. Every morning on rising there occurred uncontrollable sexual excitement, which was sometimes so acute that until a sexual discharge, spontaneously or otherwise, actual pain was felt. Distressed at his condition he had sought treatment of more than one practitioner, and had received the same advice, which resolved itself in each instance into a recommendation to exercise control.

"The radical treatment of the varicocele by operation entirely relieved these symptoms, and the change in the patient's aspect and general condition was most marked. I have ventured to mention this case, in spite of its unpleasant aspect, in brief detail, and have spoken in a general way somewhat plainly on the question of sexual irritation, because I believe unnecessary hardship is occasionally inflicted upon these unfortunate patients by what seems to be a want of knowledge of the proper relation of cause and effect on the part of those from whom advice is sought in some of these cases.

"Again, the abnormally frequent nocturnal emissions which are undoubtedly associated with a certain percentage of varicoceles are not infrequently attributed, together with

the varicocele itself, to bad practices on the part of the patient. Actually, however, this symptom is commonly the outcome of this same irritation which I am discussing, and if relief is possible, it is not by medicine and good moral advice that is to be obtained, but by operative measures. Here it is necessary to admit that all of these symptoms may be to some extent alleviated by the avoidance of scenes likely to cause the excitement feared, by the total relinquishing of exciting drink and rich food, and by persistent healthy exercise and mental occupation.

"It is well known that the first anxiety of many men, especially if they happen to be advancing in life, upon the discovery that they are the subjects of varicocele or any affection in the same locality, is with respect to its possible influence on their virility, a fact fully utilized by quacks and charlatans of every description from time immemorial. It is therefore necessary to refer as briefly as possible to those cases of supposed impotence which are occasionally seen in association with varicocele. Of real impotence under these circumstances I have never seen an instance nor do I believe in its occurrence.

"Temporary insufficiency of power may arise simply from apprehension, usually prompted by the evil prognostication of quacks or other ignorant or unscrupulous persons, especially in subjects about to marry after having led lives of dissipation. Great exhaustion from mere fatigue may affect also the genital organs in cases where the irritation of which I have been speaking has led to excessive sexual indulgence or oft-repeated involuntary emissions."

Constitutional Origin of Varicocele.

It will be found that in a large proportion of cases which seem to be attributable to certain special causes there exists a foundation for the disease in the form of an inherently defective tone of the vascular walls, akin, perhaps, to

that mysterious condition which exists in hæmophilia as far as its hereditary character is concerned.

I am very much gratified to note that Mr. Bennett in his recent excellent monograph on Varicocele has expressed similar views of the congenital foundation of the disease.[2] The question of priority is of little consequence in this connection, but it may not be out of place for me to state that the views which I have expressed are the same as those taught my classes at the College of Physicians and Surgeons in 1882. These were presented to the Southern Surgical and Gynecological Association in November, 1890, and appeared in the Medical Times and Register, August 31 and September 6, 1889, and in the Western Medical Reporter for June, 1891.

Mr. Bennett, in investigating the question of heredity, found in one hundred cases, a distinct history of heredity in about fifty; in thirty of these the history pointed to varicocele; in the remainder to varix of the lower extremities. In a typical case, the patient being one of a family of four boys, two brothers had varicoceles, and one both varicocele and varix, the father who brought the patient having most exaggerated varix of both lower limbs, as well as a varicocele.

According to Mr. Bennett, at least eighty-five per cent. of persons coming under observation with varicocele present evidence of varix in other parts, scars of old nævi, etc.

He further says that it is impossible to avoid being struck by the singular fact that this congenital origin has not received more support than it has done from previous observers, by whom it seems to have been regarded merely as an occasional or rather possible cause only. Dr. Henry Lee, as late as 1870, in a lecture on varicocele, in which the various supposed causes are enumerated, suggests the possibility of "some inherent predisposition in the 'vessels themselves,'" when speaking of heredity. Mr. Pearce Gould, in 1880, comes nearer the truth in attributing the disease to a

[2] W. H. Bennett, Varicocele, London, 1891.

"primary growth of venous tissue." Mr. Bennett states that in no work has he been able to find any sufficiently definite stress laid upon the actual congenital character of the affection.

In my personal experience a number of cases have presented themselves in which there was a distinct history of heredity. In a number of instances several members of the same generation were similarly affected by varicocele. In a few instances the aberrant vascular development was represented by varices of the extremities in the parents. In two cases there was a history of troublesome varices of the legs in the mother of the patient, and in one of these I was afterward consulted regarding obstinate ulcers and eczema of the affected limb.

I will mention at this point the interesting circumstance that within a week I have been consulted by two patients with decided evidence of a general lack of vascular tone. Both had a pronounced varicocele and varices of the legs. One consulted me regarding the varicocele and the other regarding the dilated veins of the extremities. In one of the cases there was a distinct history of heredity; in the other the history was not clear. In the former case, there was pronounced dilatation not only of the larger veins of the extremities, but also of the superficial veins of the legs, thighs, chest and abdomen.

Monod and Terrillon[3] remark, that although certain authors have laid stress upon the influence of heredity because of the fact of the occurrence of varicocele in the father or even more remotely in the line of ancestry, this proves nothing as far as the demonstration of the true nature of the malady is concerned. These authors do not accept the theory of venous aberration in general as a foundation for varicocele, principally because of the comparatively infrequent association of varicocele with varices elsewhere. With them, therefore, varicocele is *ab initio* a local malady. But

[3] Maladies du testicule et de ses annexes. Par. Ch. Monod et O. Terrillon. Paris, 1889.

it is difficult to appreciate the philosophy of this reasoning. Do we reject the theory of local minor resistancy dependent on a general tissue vulnerability to tuberculosis, in pulmonary tuberculosis, simply because there is no development elsewhere? To be sure there is no microbe in varicocele, but the predisposition—the inherent tissue weakness—existing, the determining factors which have been mentioned in varicocele bear the same relation to the subsequent pathological changes as do the bacilli to the subsequent tubercular deposit. A general tendency to venous dilatation may manifest itself at some particular point or never do so at all;—all depends upon the exciting cause.

Monod and Terrillon remark in regard to Spencer's theory of the persistence of fœtal veins which ordinarily undergo complete involution in childhood, as a cause of varicocele,[1] that "it does not appear to be supported by positive proof," which assertion is hardly to be questioned.

The analogy of hæmophilia to the general condition of structural venous instability which I have advanced may seem a trifle far-fetched, more particularly as the pathology of hæmophilia is as yet a *terra incognita*, or at least still remains for the most part a question *sub judice*. Inasmuch, however, as it is an established fact that hæmophilia is of an hereditary character, and moreover, as the manifestations of the disease are probably dependent to a great extent on defective arterial structure and contractility, it is fair to assume that a similarly defective tone of the venous walls may exist. A case has recently come under my observation which illustrates in a forcible manner the association of perverted vascular tone and blood quality with varicocele. An epileptic was referred to me by Dr. S. V. Clevenger for consultation. This man had a very large varicocele which annoyed him greatly, the chief complaint being that the profuse perspiration which bathed the part was almost constantly of a sanguineous character. The patient informed

[1] St. Bartholomew's Hosp. Rep. 1887.

me that his seminal ejaculations were always heavily tinged with blood.

My friend Dr. F. W. McRae, of Atlanta, Ga., has described a similar case to me, in which the scrotal hæmidrosis was quite distinct. These cases are the only examples of this peculiar condition which have come under my observation. As an illustration of the fact that vaso-motor aberration probably existed in my case, I will state that I operated upon the patient for stricture and had a very alarming hemorrhage to deal with, which persisted for many days.

In this connection I recall a very interesting case in which hæmophilia and venous aberration were apparently associated. The case was that of a lad who was my playmate during my boyhood, whose prominence of venous development was a matter of comment among the boys with whom he was wont to go in bathing. He was subject to frequent and obstinate epistaxis, and it was noticed that slight cuts tended to bleed inordinately. This hemorrhagic tendency he evidently recovered from. A few years ago I operated upon my former playmate for the largest varicocele I have ever seen.

Notwithstanding what has been said, and despite the fact that the relation of varices of the lower extremities to varicocele is very interesting, no very satisfactory statistics are as yet forthcoming. Landouzy was the first to investigate this point, but his investigations were hardly complete enough to be regarded as at all conclusive. He found in fifteen cases only one who had at the same time varicosities of the extremities. In twenty others who had varicosities there was no trace of varicocele, hence he did not admit any relation between the two. It is hardly necessary to call attention to the fallaciousness of such a confusion of *propter* and *post*. Curling states that he has often seen the veins of the extremities voluminously dilated in subjects affected by varices of the spermatic cord.

The question naturally arises whether varicocele may

not be associated with disease of the veins in other situations than the legs; for example, in the hemorrhoidal plexus. Monod and Terrillon remark on this point, "The discrepancy between authors from this point of view may be explained by the fact that the varices of the rectum, spermatic cord, and inferior extremities do not appear simultaneously but successively. We could cite a patient who had first a left-sided varicocele, three years after he had hemorrhoids, and two years later still, appeared varices of the extremities." The occasional association of varicocele and hemorrhoids is indubitable and by no means surprising.

From what has been said it is evident that varicocele is, in a general way, usually met with in comparatively feeble subjects. Occasionally, from some special cause involving trauma, robust individuals are affected by it, but such cases are exceptions to the rule. It is to be remembered in this connection, that varicocele may develop during a period characterized by debility, but the patient may not present himself for examination or treatment until he has acquired a more robust appearance. A delicate youth may develop a varicocele, yet subsequently become a robust and vigorous man. Mistakes in etiological deductions are doubtless frequently made under such circumstances.

Mechanical Causes of Varicocele.

Varicocele has been known to occur from heavy lifting and athletic strain of various kinds. I have seen several cases which were probably of this origin. Keyes describes this variety. Years ago, Percival Pott described what he termed "acute varicocele" due to a combination of fatigue, injury to the part and exposure to cold, the condition being followed by complete atrophy of the testis. These cases were probably phlebitis of the spermatic plexus which was followed by complete occlusion of their lumen. Orchitis was possibly an attendant condition.

That physical effort of a prolonged and violent character is not only capable of favoring the development of varicocele in the early stages, but of increasing a varicocele already existing, is hardly open to question. M. Gaujot has shown that in young soldiers violent exercise and the fatigue of long marches not only cause a rapid increase in size of varicocele, but are apt to produce considerable pain and tenderness, and perhaps actual inflammation of the varicocele—an occasional blow from the pommel of the saddle being a secondary but by no means unimportant consideration. Varicocele from this cause is especially apt to be associated with hemorrhoids. The records of the pension office are very interesting in this connection.

Chronic constipation is regarded by many surgeons as a very fertile source of varicocele; this I accept, providing the constitutional defect already described be associated with it. Constipation alone, I believe to be insufficient to produce varicocele. The pressure of accumulated fæces upon the left spermatic vein tends to retard the return circulation, and if the venous walls be naturally defective, varicocele may result.

Bennett is still more inclined to question the potency of constipation as a causal factor of varicocele, as will be observed in my quotation of his views on the causes of the disease.

The pressure of a truss sometimes produces varicocele in conjunction with a hernia; indeed, the pressure of a hernia itself has been alleged to cause varicocele. This is worthy of note, inasmuch as the application of a truss for the cure of varicocele is recommended by several excellent authorities, as will be seen later. It is to be remembered in connection with the etiology of varicocele that constitutional debility may bear the relation to the disease of both cause and effect.

Mr. Bennett has discoursed upon the causes of varicocele quite exhaustively, and with an ingenious originality

which commands admiration. The following is a *resumé* of his views.

"Theoretically, it may be conceded that any condition in which the support natural to the veins has been removed or modified, would contribute to their distention and possible over-dilatation. Practically, this factor is very unimportant, as there is nothing to support the view that the withdrawal of the natural support which is supposed by some to be afforded by the scrotum has any relation to the true increase of the disease, as I shall attempt to show. The state of the cremaster muscle has, however, I think, a certain relation to the amount of distention possible in a well-marked varicocele.

"It can hardly be said that, setting aside the actual obstruction of the blood stream by the pressure of tumors, there is any evidence whatever of either of these so-called causes being even contributary. Certainly neither of them deserve serious consideration in this respect, excepting residence in hot climates, and perhaps constipation, which although it does not actually influence the growth in the sense it is often understood and described to do, bears an incidental relation to the disease which is at least interesting. Accepting the view which seems fair, viz., that the factor which leads to the growth at the later periods is increased intravenous pressure, the explanation which appears to me the most reasonable is afforded by the direct connection of the spermatic vein with the portal system by means of the colico-spermatic branches, which I have described, for it is clear that although these vessels vary greatly in size in different subjects, they are large enough in some to allow any engorgment or obstruction of the portal circulation to throw increased pressure upon the spermatic vein, especially if by chance, as in one instance, any immediate communication existed with the trunk of the mesenteric vein.

"The pressure thus arising would of necessity bear a direct ratio to that in the portal system, but for practical

purposes it would depend in degree upon the size of the colico-spermatic veins, which are sometimes so small that the amount of backward pressure transmitted through them could hardly affect the tension in the spermatic circulation to any appreciable extent.

"If the grounds upon which this view is based are at all sound, it follows that the liability of varicocele to increase at periods subsequent to puberty must depend, to a great extent at all events, upon the existence of a sufficiently free communication between the portal system and spermatic veins, by means either of large colico-spermatic branches, or possibly in some cases by more direct connection with the large branches of the portal vein.

"To produce actual proof of this is impossible, since it could only be provided by dissection of a large number of subjects known to have had varicocele which had increased at the time now being discussed. Circumstantial evidence of considerable weight is nevertheless forthcoming on the following points:

"1. It is, I presume, generally known that the growth of varicocele at these later periods is not unfrequently associated with the development of piles, and that remedies which remove the feeling of weight and discomfort about the rectum in such cases have an equally good effect upon any feeling of distention about the varicocele; these remedies being, for the most part, drugs which directly excite the secretion of the liver, and so relieve the tension in the portal system.

"2. Residence in hot climates, especially in India, is admitted to be a cause of this kind of increase; it is also an admitted cause for the development of piles. Now, although the increase of the disease in hot climates is to some extent more frequent than in this country, the difference is very slight, and certainly not more than could be accounted for by the well-known tendency to liver derangements, with resulting portal engorgement, which is so prevalent in certain

climates. Even then it seems obvious that the increase of the disease must depend upon some peculiarity of the veins, otherwise it should affect a much greater proportion of cases than it actually does. Again, it would affect both sides equally, which it surely does not do.

"The cause to which the increase in hot climates is usually ascribed is the general relaxation of parts which is produced by the extreme heat, etc., the result being the loss of the natural support supplied by the relaxed tissues. Although this may give rise to some fullness and discomfort, I have never seen any reason to infer that actual growth could be thus produced, for if it were so, the effect would be altogether more uniform in its distribution over the aggregate number of cases influenced by this supposed cause.

"3. Varicoceles on the right side rarely, if ever, increase except at the time of puberty; those of the left side not uncommonly do so at later periods. I have already said, in cases in which the affection is double, that on the left side may grow, whilst that on the right remains unchanged. Here again it seems clear that this tendency to growth must be associated with some peculiarity in the veins on the two sides, and the only constant difference, excepting in the way of size and length, which could affect the matter at all is the frequent communication with the portal system, which is normally entirely limited to the left side, and is sometimes very free. It is on the whole, therefore, not altogether unreasonable to connect the relative frequency of increase on the left side with the occasional existence of this free communication.

"I much doubt whether it is anatomically possible for a loaded colon under any circumstances to exert direct pressure upon the spermatic vein sufficient to merit consideration. Moreover, it has been shown again and again that the increase in the affection may, and does, occur quite independently of constipation, whilst on the other hand, constipation of the most exaggerated kind frequently co-exists with varicocele without influencing its growth in any way.

"This condition may, therefore, be regarded merely as an incident due possibly to the same cause as the increase of the varicocele, and having no other relation to it, the cause referred to being engorgement of the portal system, which may, however, occur without producing constipation, thus explaining the frequent absence of any relation between this condition and the growth of varicocele. In the same way constipation is frequently associated with piles, but it is not actually necessary for their production, and in fact often bears only the incidental relation to that complaint of being due to the same cause.

"The following so-called causes may be safely regarded as having no real bearing upon the origin of varicocele.

"(*a*) Great length of the veins on both sides and the manner of termination of the left in the renal vein at a right angle.

"(*b*) Loss of valvular function. The valvular arrangements are altogether too uncertain and irregular in the spermatic veins and plexus to have any effect as a cause. Their presence, absence, or insufficiency may, however, affect the form of the tumor.

"(*c*) Thinness of the vein walls. There is no good reason for supposing that the veins in varicocele are *ab initio* thicker than normal. Further, there is no reason for assuming that the veins are under normal circumstances too thin to meet the physiological requirements of the part.

"(*d*) Alternating fullness and emptiness in different positions of the body. This is the universal character of the venous circulation in every part of the body, affecting all individuals in like manner.

"(*e*) Petit's theory of the disadvantage to the circulation in the spermatic veins arising from their pulley-like relation to the pubic bone. Apart from other considerations, this is disproved by the fact that, although varicocele exists less frequently and rarely grows on the right side, the bend in the veins on that side (the right) is quite as acute as on the left.

"(*f*) Lenoir's theory, that the frequency of occurrence on the left side is due to the pressure exerted upon the veins of that side, as they pass through the abdominal ring, by the constant bending of the body to the right side during the lifting of heavy weights, etc. If this were so, then varicocele in left-handed men should occur only on the right side, which is not the case.

"(*g*) Inflammation of testicle or scrotum. This condition is much more likely to cause some shrinking of the affection from the veins becoming blocked by thrombus, the result of extension of inflammation to the tissues around the vessels.

"(*h*) Pressure of omentum in fat people (Astley Cooper). Varicoceles are not more common in fat people than in spare subjects."

CHAPTER IV.

Period of Development and Morbid Anatomy of Varicocele.

Varicocele occurs with the greatest frequency between the ages of fifteen and thirty-five, this being the period when all the faculties of the body are at their maximum and physical growth is most active; or better, this is the period when there is a degree of growth far in excess of the inherent strength of tissue.

It is at this period also, that perverted sexual habits and hygiene are apt to enter into the daily life of the patient, either in the form of sexual excess, sexual excitement without gratification, or most frequently, masturbation. It is at this age that men are most likely to overtax their strength; then, too, the effects of exhaustion are most severe, especially near the period of puberty. Varicocele is occasionally met with in young children, and in such cases there is not only a pronounced atonicity of vascular structure in general, but evidences of sexual precocity. In certain rare instances it has been known to occur after middle life, in which event there is a decidedly disproportionate varicocity of the scrotal veins.

Landouzy observed in thirty-six cases the following periods of development:

9	at	from		9	to	15	years	of	age.
20	"	"		15	"	25	"	"	"
3	"	"		25	"	35	"	"	"
4		above				35	"	"	"
						35			

Curling made an almost similar observation. Thus, in fifty cases there were:

2	at	from	10	to	15	years	of	age.
26	"	"	15	"	25	"	"	"
14	"	"	25	"	35	"	"	"
5	"	"	35	"	45	"	"	"
3	"	"	45	"	65	"	"	"

The average in this table is about equivalent to that of Landouzy. Nelaton gives the years from fifteen to twenty-five as the most favorable to the development of varicocele. Helot states that it is most often developed at from ten to thirty-five years.

Bennett asserts that there are two periods when the disease is apt to increase, viz: at puberty, and at about the age of thirty-five. He has seen it develop in old men, and has met with it in many children of from five to eight years of age. In one case he found a marked varicocele in a boy of four on the post-mortem table, and on another occasion he found an incipient varicocele in a fœtus. These cases are all sufficient proofs of the frequently congenital nature of varicocele.

Morbid Anatomy of Varicocele.

The morbid anatomy of varicocele comprises few changes of importance. The pathological changes consist mainly in dilatation and tortuosity of the veins with a coincident loss of elasticity and contractility. There is usually more or less increase in the thickness of the venous walls. This, however, does not make the vessels proportionately stronger because of the fact that the vessels are enormously dilated, and their walls are consequently much thinner in proportion to the bulk and weight of the contained blood than is the case with normal vessels. Not only are the elastic and contractile elements of the vascular walls absorbed in pronounced varicocele, but they are replaced by a low grade of connective

or fibro-connective tissue. These conditions enhance the structural weakness.

Subacute or chronic inflammatory changes may occur and cause primarily still further thickening, and secondarily a more pronounced degree of degeneration of the vessels. As a consequence of these conditions of innutrition, areas of fatty degeneration may develop. These degenerated areas explain the occasional occurrence of hæmatocele of the scrotum from slight exciting causes in severe varicocele.

Acute phlebitis may attack varicocele and prove a serious matter. Vidal de Cassis reported two cases of this kind, one due to a kick and the other to propagation of inflammation from an acute epididymitis. *Plaques* of calcific deposit may be observed in some cases and phleboliths are by no means rare; oftentimes these concretions may be felt from the exterior. The valves of the involved veins are a dead letter as far as their functionating capacity is concerned: so degenerated do they become that they present the appearance of rudimentary valves in other situations.

If we dissect with care, the dilated veins, it will appear that their number is greatly augmented. This is due to the enormous dilatation of the smaller venules and the enlargement affecting even the venulets of the walls of the veins proper. Often it is easy to discern three distinct groups of dilated veins, one coming from the superior border of the testis at about its middle portion, a second in front of the testis and a third along the deferent canal and appearing to originate chiefly in the vicinity of the globus minor of the epididymis. These groups of dilated veins correspond to the three varieties of varicocele described by some anatomists. In most cases the veins form an inextricable mass; they communicate one with the other by numerous and capacious anastomotic connections. In this jungle of vessels the vas deferens is partially if not wholly lost, especially at its inferior portion where it is to be distinguished with great difficulty.

Varicocele may be partial; often the anterior group of

veins is alone involved. According to Horteloup the posterior plexus is sometimes alone involved, or at least forms the principal bulk of the varicocele. Perier lays stress upon the fact that it is the spermatic and not the funicular veins that are affected in varicocele.

The tumor formed by the dilated veins presents a conical form, the base of the cone corresponding to the testicle, and the apex being lost in the inguinal canal.

Fig. 1.

Dissection of Varicocele. (Moullin).

When the walls of the veins are encrusted with calcareous salts, or phleboliths form in their lumen, the vessels may be so resistant to the touch that they cannot be distinguished from the vas deferens. Histologically, the walls of the affected veins present the same characters as varicose veins of the inferior extremities. The pathological changes are found chiefly in the tunica media, the tunica intima being usually little altered. It is in the middle tunic that an

increase in connective tissue and muscular elements and calcareous deposits is found. The cellular tissue about the affected part is increased in volume and less flexible than in its normal condition.

According to Cornil, the ultimate lesion in varicocele may be summed up as a chronic inflammation of the venous walls, very like that which is found in the arteries—endarteritis deformans—and which leads to atheroma and calcific deposit.

According to Doumenge[1] and Lannelongue, varicocele is limited to the globus minor; the tail of the epididymis presents special features for consideration. I fail, however, to see anything of practical importance in their hair-splitting observations. A fact worthy of remark, however, is that this form of varicocele may appear in advanced age and may exist without involvement of the veins of the spermatic cord. This fact I believe to be due to damage done in early life, by the localization of exudate in acute epididymitis about the globus minor, with resulting local perturbation of venous drainage. Monod and Terrillon claim that in the reported cases no evidences of preceding lesion have been found, but patients are proverbially forgetful, and not every epididymitis that leaves a permanent impression upon vascular supply, leaves an area of induration.

The tunica vaginalis often contains a variable amount of fluid in varicocele, and as Monod and Terrillon justly remark, this should be expected from our knowledge of the relation of circulatory disturbances of the epididymitis incidental to acute inflammation.

The testicle of the affected side rarely retains its structural integrity; but becomes softer than normal, shrunken and atrophied; in severe cases it may be difficult to detect amidst the worm-like mass of veins. There is, of course, no method of determining its functional power with any degree of accuracy, excepting where the opposite testicle is out of

[1] Varicocele de la queue d'lépididyme. Th. de Paris, 1875.

service, but the physical condition of the organ is a very fair criterion of its physiological activity.

There has been much discussion *pro* and *con* regarding the question of atrophy of the testis as a consequence of varicocele, some believing that atrophy never occurs, while others claim that it is quite constant. Sir James Paget vigorously contests the idea of atrophy secondary to varicocele, while Curling was as outspoken in the contrary opinion. The latter, in his famous work, gives many examples of such atrophy. Among later authors who substantiate Curling's views are Will, Percival Pott, Henry Lee, Pearce Gould, Gosselin, Kocher, Barwell, Monod and Terrillon.

Bennett claims that the atrophy is apparent, not real, being a lack of development and not a true shrinkage. He says:

"I have been entirely unable to trace any evidence of the testicle having diminished in size in any case of varicocele in which syphilis or gonorrhœa had not been an evident contributary cause to the wasting, or in which an operation had not been performed. Wasting from this latter cause should not occur."

I do not agree with Mr. Bennett in this particular. I have certainly noted progressive wasting in a number of marked cases of varicocele. While acknowledging that the primary aberration of the development of the testis may often be congenital and a concomitant rather than a resultant condition, I must believe from the evidence at my command that his assertion is too sweeping.

The extraordinary development of the shrunken testis, after cure of the varicocele, is to me the best evidence of the causal relation of the varix to the testicular atrophy, and of its being a true atrophy.

It is certainly worthy of remark that an operation for varicocele, properly performed, often results in a marked increase in the size of the affected testis, with a return of the natural fullness and resistancy and a restoration of sensi-

bility of the organ. In several of my cases the improvement of the testis was more than striking.

The cutaneous, muscular and serous envelopes of the testis participate in the general and local lack of tone, and the veins of the organ proper become dilated and varicose. The scrotum is lax, thinned and pendulous, and on section the fibres of the dartos muscle will be found to be sparse and fragile. Elastic tissue is also much scantier than normal.

In general, the cutaneous structure proper is thinner and more distensible than in its normal condition. The scrotal veins are dilated, tortuous and thinned, their varicocity in some cases being quite remarkable. This condition of the veins is an additional evidence of the general lack of vascular tonicity.

Verneuil describes two cases of erectile venous tumors of the scrotum associated with varicocele, which showed a marked tendency to spontaneous inflammation. Escallier reported two similar cases which spontaneously underwent suppuration, with a fatal result.[2]

These cases were of very large varicoceles, in residents of a hot climate. One was a negro from Guadalupe and the other a merchant of Brazil. Death resulted in both cases, with symptoms of internal strangulation. Curling mentions the possibility of such cases, but does not seem to have observed any. Vallin has reported a case of acute phlebitis of double varicocele, with death on the fourth day.[3]

It is worthy of note that this same acute phlebitis is the chief danger of operations designed for the cure of varicocele.

It is questionable whether some form of infection is not necessary for the production of such untoward results of varicocele. Certainly, there can be little doubt as to the necessity for infection in fatal phlebitis following operative

[2] Deux cas de varicocèle suivis de phlébite et de suppuration. Mort. Mem. soc. de Chir. 1849-50.

[3] Gazette hebdom, 1877, No. 52 et France Medicale, 15th Dec., 1877.

interference. I incline to the opinion that the same holds good in so-called spontaneous phlebitis, and in that form which takes its apparent point of departure in accidental traumatism.

In a general way it may be accepted that in most cases of varicocele the disease primarily involves the anterior plexus alone. The posterior plexus, however, becomes secondarily involved later on in many cases. In an extremely small proportion of cases the posterior plexus is alone involved.

CHAPTER V.

Symptoms of Varicocele.

The symptoms of varicocele are in the main so familiar that their description is only necessary for completeness. They necessarily vary according to the severity of the varix. Varicocele usually begins very slowly, and does not apprise the patient of its presence for a long time. Occasionally it becomes very large, yet attracts no attention until perhaps after prolonged fatigue, when it becomes productive of discomfort. It gradually increases, however, and finally acquires the dimensions of a good-sized hen's egg to a large orange. In exceptional cases, even this enormous size is exceeded.

When varicocele begins suddenly, it is usually after injury or after violent physical exertion. It must be acknowledged, however, that the true condition in such cases may possibly be,—and very probably is in some cases,—a sudden increase in volume of a pre-existing varicocele which has hitherto remained unperceived. Again, the pre-existent varix may not be at all enlarged by the trauma, yet the latter serves to direct the patient's attention to something of the existence of which he had previously been unaware.

The first thing to attract the attention of the patient is usually enlargement of the veins, producing, as the patient erroneously supposes, a slightly tumorous condition of the testicle. This enlargement is in many cases so slight that it is of no practical importance, and should hardly be designated as a varicocele; its principal effect in such cases

being a greater or less disturbance of the *morale* of the patient. Those individuals who consult the surgeon regarding the slighter forms of varicocele are usually masturbators who have become aware of the possible evil effects of the practice and who, under the stimulus of quack literature, are practicing a most rigid introspection and frantically searching for morbid effects of their vicious habits. In their daily inspection of the genitals these patients discover a slight enlargement of one or the other testicle. Possibly at this time their attention is first called to the fact that one testicle hangs lower than the other. The discovery of this condition in combination with guilty self-consciousness impels the patient to seek relief; only too often he consults the quack, who finds in such patients his richest harvest. Should pollutions or spermatorrhœa be present, then, indeed, is the quack in clover.

These slight enlargements of the spermatic veins are due to imperfect sexual hygiene with attendant venous congestion, and should be called spermatic congestion, rather than dignified by the term varicocele. They generally disappear after normal sexual relations have been established, and it is rare for such patients to consult the surgeon after they have once been happily married. Operative interference in these cases is usually unwarrantable. Even in these slight cases, however, there may be neuralgic symptoms of sufficient severity to warrant treatment, both general and local.

The spontaneous disappearance of varicocele, especially in patients who faithfully employ a suspensory, is occasionally noted. M. Leon Le Fort claims that it often disappears at about thirty years of age, enabling the patient to dispense with artificial support. Kocher makes a similar assertion, and Monod and Terrillon state that they have observed such a spontaneous cure *many times* (?) I doubt the accuracy of these observations. As I have already remarked, every case of turgescence of the spermatic veins

is not a varicocele. Once pronounced changes in the venous walls have occurred, I do not believe spontaneous cure to be possible.

Varicocele in its more marked form is readily recognizable. It presents a soft, mushy tumor, which is ordinarily said to resemble a bunch of earth-worms in a sac. This description is very accurate, as every surgeon knows. The veins of the scrotum are very often tortuous and dilated. Varicocele is not supposed to be tender on pressure, but if phlebitis exists or there is severe neuralgia of the testicle and cord, the part is apt to be extremely hyperæsthetic. In the majority of advanced cases the testicle is not only atrophied, but is extremely insensitive to touch or even pressure. Phleboliths may be detected within the veins and may perhaps be the centers of inflammatory changes and consequent tenderness. The thinning of the scrotum incidental to varicocele is at once noticeable. There will also be observed a tendency to pigmentation and oftentimes a purplish hue.

The subjective symptoms of varicocele vary greatly; this is especially true of those of a mental character. A case of moderate varicocele in which the mind of the patient has not been disturbed by quack literature or the rigid introspection induced by a knowledge of the evils of masturbation is apt to cause little or no inconvenience. In nearly all well-marked cases, however, the conditions are decidedly unfavorable to mental composure and a greater or less degree of physical suffering is almost inevitable. The testicle is an extremely sensitive organ and its nervous supply is so closely associated with the great sympathetic system that diseases affecting its structure might rationally be expected to produce general nervous disturbance as well as pronounced local symptoms. The painful and depressing character of orchitis and epididymitis is sufficient to show that disturbances of the testicle are productive of a disproportionate degree of general disturbance. This is characteristic of all diseases of the sexual apparatus—we all know what serious symptoms

may follow a phimosed prepuce or a contracted meatus. If these slight affections produce such effects, how much more likely is varicocele to cause great annoyance from the constant dragging upon so sensitive a structure as the spermatic cord and the incidental congestion of a still more sensitive testicle.

I speak of these points more particularly because most surgeons are inclined to believe that all of the symptoms described by the subjects of varicocele are imaginary. This belief is hardly consistent with our physiological and anatomical knowledge, yet it prevails even among those who would sacrifice an ovary upon the slightest pretext. It might be a good plan for the practitioner to learn more of the reflex and other phenomena dependent upon morbid conditions of the male sexual apparatus, the more especially as the consideration of a method of treatment similar to that advocated indiscriminately in certain quarters, for the female, would save a few bushels of ovaries and appendages. It is safe to say, moreover, that not a testicle would be lost.

In the majority of cases of pronounced varicocele a greater or less degree of mental depression and sexual hyperchondriasis exists, and in certain instances serves to make life miserable. Vidal has called attention to the fact that suicidal impulses are occasionally observed in the subjects of varicocele. He notes the case of a hospital physician who told him that he had decided to blow his brains out in case he could not be promised a cure. If the tumor be very large and the patient sensitive the physical deformity may cause great annoyance. This was marked in some of my cases.

Whether as a coincidental effect of a similar cause or as an effect of the varicocele *per se*, there exists in nearly every case of severe varicocele a decided loss of tone of the sexual apparatus. The symptoms indicative of this are in my estimation often directly dependent upon the varicocele. Pseudo impotence, frequent pollutions and spermatorrhœa are often met with, and may persist in spite of treatment until

the varicocele has been operated upon. Irritability of the vesical neck, vesical hyperæsthesia or neuralgia—neuralgia of the testes and cord, a painful sense of dragging and weight along the cord, penile or urethral neuralgia, pain in the back and crural neuralgia are quite constant symptoms, the pain in the back being usually the most marked.

So severe may the neuralgic manifestations of varicocele become, that some patients are unable to earn their livelihood. The least exertion may bring on acute exacerbations of pain and tenderness. In military life this is the chief cause of disability. Temperature seems to have a marked effect on this pain as well as on the development of the varicocele *per se*. Thus varicocele is most frequent and the disability which it occasions most severe in hot climates.

It is a noteworthy fact to which Curling and Gosselin have called especial attention, that varicocele is only painful in young persons. Old, or even middle-aged men with very large varicoceles usually suffer with little or no pain. When pain exists it is usually in the early period of varicocele. This is explicable only upon the theory that it is not the varix *per se* that is productive of pain, but the varying state of the blood supply and secretion of the testicle incidental to sexual disquiet at the period when the nervous receptivity is most exalted. It is not unusual for the pain of varicocele to disappear under regular and natural sexual gratification without appreciable decrease in the volume of the varix.

There is no question that the pain in varicocele may be very severe and discommoding. The fact that patients occasionally beg for castration conclusively proves this. Curling cites numerous operations performed under these conditions by Brodie, Gooch, Key and others. A point worthy of attention and one which has been verified by one of my own cases is, that cure of varicocele does not always cure the pain. The patient may in rare instances suffer continually after complete cure of the varix.

As already quoted in connection with the etiology of the

disease, Bennett says with reference to the possible association of impotence with varicocele: "It is well known that the first anxiety of many men, especially if they happen to be advancing in life, upon the discovery that they are the subjects of varicocele or any other affection in the same locality, is with respect to its influence on their virility, a fact fully utilized by quacks and charlatans of every description from time immemorial. It is therefore necessary to refer to these cases of supposed impotence which are occasionally seen in association with varicocele. Of real impotence under these circumstances I have never seen an instance, nor do I believe in its occurrence. Temporary insufficiency of power may arise, simply from apprehension, usually prompted by the evil prognostications of quacks or other ignorant or unscrupulous persons, *especially in subjects about to marry after having lead lives of dissipation.** Great exhaustion from mere fatigue may affect also the genital organs in cases where the irritation of which I have been speaking has led to excessive sexual indulgences, or oft repeated involuntary emissions."

Bennett is not so clear upon this point as might be wished, but as far as it goes it is directly contradictory to what he says regarding the relation of masturbation to varicocele.

If, as he says,—and I believe him to be in the main correct—, the varicocele is the cause rather than the result of sexual depravity and aberration, through its debilitating and irritating effect upon the sexual system, partial or complete impotency might naturally be expected from the same cause. Prolonged sexual irritation finally induces sexual exhaustion, and impotency is a frequent result of such exhaustion. In the hue-and-cry which we raise against the quack, we are too prone to accuse him of feeding upon imaginary ills, forgetting that patients with real ailments are as truly his prey as are those with *maladies imaginaire*. To our own apathy

*Italics mine.

and often our ignorance regarding what to the patient is a real calamity,—whether physical or mental, temporary or permanent,—much of the prosperity of the charlatan is due. In my experience varicocele certainly has been productive of loss of sexual vigor, due not only to the mental effect of the disease, but also to the dragging pain and sexual abuse produced by the varicocele *per se*. I have seen complete impotency result.

The indifference exhibited by some physicians to sexual ailments, simply because tradition says they are mainly imaginary, has been very calamitous to patients. If we are to ignore or abjure sexual aberrations solely because we believe them to be unassociated with organic lesions, we must apply an entirely different system of reasoning to such ailments from that which is permissible or common elsewhere. The patient reasons from the standpoint of utility of his sexual organs, and to him the result is the same, whether nervous inhibition or organic disease be at the bottom of the malady.

To refuse to countenance such cases is as rational as to refuse to prescribe for a case of nervous dyspepsia, because forsooth it has originated in a perturbation of function incidental to mental emotions. The patient cannot be gainsaid his opinion regarding the vigor and stability of his erections; they are an object-lesson more convincing to him than any fanciful theory or medical skepticism regarding his ailment. Bennett qualifies by saying, "especially in subjects about to marry after leading lives of dissipation." It is in just such men that we should expect impotence. The qualification "true impotence" is often misapplied. If the man cannot copulate, he is as truly impotent for the *nonce* as if his penis had been amputated. The duration of the impotence is a difference of degree, albeit dependent perhaps on a difference of etiology. If respectable physicians would pay a little conscientious attention to these matters, the quack would soon cease to thrive.

Jamin reports a case of "congenital impotence" apparently due to varicocele and completely cured by operation.

When the varicocele is very large, the scrotum extremely lax and pendulous and its veins greatly dilated and tortuous, considerable mechanical discomfort may be experienced; as one of my patients expressed it, the tumor "flopped against his legs like a cow's bag." Should the sudoriferous secretion from the relaxed scrotum be excessive, pruritus, intertrigo and often intractable eczema may result. I have a patient at the present time who has a most obstinate and almost intolerable eczema due to a very large varicocele. The ordinary remedies have proven ineffectual, but as the patient has no appetite for surgical operations my sympathies are necessarily reduced to a minimum. The cutaneous irritation incidental to varicocele was long ago mentioned by Landouzy as an indication for operation; as he expressed it, "the continual moisture sometimes produces a perfectly unbearable irritation of the skin." The dermatitis incidental to varicocele is obviously due in some measure to friction which is unavoidable.

Wickham calls attention to violent gastralgia(?), chlorosis and marked malnutrition as results of varicocele.

In recounting the symptoms incidental to large varicoceles I do not wish to appear dogmatic, as the pain and other uncomfortable symptoms are not necessarily proportionate to the severity of the disease. In some cases of slight varicocele the patient is profoundly depressed and complains greatly of reflex pains in the back, thighs and testes with associated marked hypochondriasis. In other cases a large varicocele may produce no discomfort whatever, save that which is incidental to its size and the consequent mechanical inconvenience; consisting chiefly in impeded locomotion. Much depends on the sexual hygiene of the patient. If this be normal, his symptoms are apt to be comparatively slight. The relief of congestion incidental to sexual congress was long since noted as beneficial to varico-

cele.[1] Wickham, however, reports a case in which all the symptoms were aggravated for some days, by each act of coition.[2] In lieu of impotency, varicocele has been known to produce the other extreme; thus G. T. Welsh reports a case of satyriasis cured by the radical operation for the varicocele upon which it apparently depended.

Complications of Varicocele.

An important point in the consideration of varicocele is *the danger of scrotal hæmatocele.* The friable, degenerated vessels are liable to rupture under falls, blows or strains. One case of hæmatocele from injury of a varicocele, has come under my own observation. Vidal reported two cases of this kind. That the diseased veins may rupture spontaneously has been asserted, but I regard this accident as highly improbable, although perhaps not impossible. Escallier's cases of spontaneous (?) phlebitis already quoted are important in this connection.

Bennett alludes to possible accidents and complications, as follows: "Slight injuries may cause pain and tenderness merely of a transitory nature. Injuries (e. g. sharp blows) of a more severe kind may be followed by inflammation and thrombus. Occasionally a large blood tumor follows upon injury, in consequence of the actual rupture or laceration of one of the veins; the probability of such a lesion occurring will depend partly upon the violence of the injury, and partly upon the condition of the veins, which, if full and tense, are naturally more liable to rupture than when comparatively empty or flaccid. It has been stated that a hæmatocele may be thus caused, but the bleeding is much more likely to take place into the cellular tissue around the veins than into the tunica vaginalis. The largest blood extravasa-

[1] Landouzy op. cit.

[2] These de Paris.

tion I have ever seen in the scrotum was due to a blow on a varicocele from a cricket-ball.

"Spontaneous rupture is very rare. I was, however, fortunate enough several years ago to see a case in an old man whose varicocele undoubtedly burst whilst he was straining at stool, a large blood extravasation being the result. No harm followed; the blood was gradually absorbed leaving a considerable portion of the veins completely blocked.

"Thrombus may be due to injury or to extension of inflammation from neighboring parts, as, for instance, in cases of epididymitis of gonorrhœal origin. In either of these cases there is much pain and tenderness. Thrombus of a perfectly passive kind occurs in gouty subjects, in persons who have been long resident in hot climates, and in those who are the subjects of heart disease or very feeble circulation. Evidence of ancient thrombus, in the form of nodules of fibrous consistency or actual phleboliths, may be felt in not a few of the varicocele seen in old people."

Atrophy of the testicle, already alluded to, is in my opinion an inevitable result, sooner or later, in severe varicocele. This is an important consideration, as the sound testicle may become diseased independently of the varix, and lose its functional power. This I regard as one of the prime indications for surgical interference in large varicoceles.

That varicocele affects the structural integrity of the testes has been observed by such writers as Curling, Cooper, Barwell, Pott and Humphrey. Numerous French writers, notably Gosselin and Wickham, have asserted that the function of the testicle is impaired. In one of Gosselin's cases of marked varicocele on the left side, the patient developed an epididymitis in the opposite testicle. Microscopical examination of the semen showed the complete absence of spermatozoa.

I have had the good fortune within the past month to make a similar observation. The patient has a severe

varicocele with almost complete atrophy of the testis, scarcely a vestige of that organ remaining. He recently came to me with a furious epididymitis of the normal testis, and I took advantage of the opportunity to make an examination of the semen after he began copulating again. Three separate examinations of that fluid failed to demonstrate a single spermatozoid. The patient has since passed from my observation. This is an unfortunate circumstance, as it would be very interesting to ascertain whether, after some months, the spermatozoa would reappear.

This point is well worthy of serious consideration, for under certain circumstances an operation, producing as it does improvement in the nutrition and function of the testes, would be warranted by this indication alone.

There is one practical point which, so far as I know, has not been noted by surgical authorities: I refer to the predisposition to hernia existing in the subjects of varicocele. I have observed several cases in which hernia followed a slight strain, in adults who had long been affected by varicocele. It is admitted that the same constitutional weakness and local structural imperfection that predisposes to varicocele favors the occurrence of hernia, but it has seemed to me that the varicocele *per se* has a direct mechanical influence in favoring the escape of the abdominal contents. The continual dragging of the varicocele upon the structures traversing the inguinal rings and canal must necessarily enlarge these structures, and thus weaken the abdominal walls at this point. The relaxed condition of the scrotal tissues is also a favoring element in the causation of hernia. The hernia is obviously most apt to occur upon the side of the varicocele, but in some instances the opposite side is affected. Here the causal influence of the varix *per se* is not easily demonstrable, but scrotal relaxation and dragging doubtless have some effect.

CHAPTER VI.

The Treatment of Varicocele.

General and Palliative Treatment.

The treatment of varicocele has called forth the ingenuity of surgeons in many ways, and it is my desire to present as clearly and briefly as possible the numerous methods that have been suggested by various authorities.

The treatment of varicocele in its milder forms is altogether palliative—in fact, in a large proportion of cases it is only necessary to allay the patient's mental annoyance by a little sound physiological advice. Instruction in sexual physiology and hygiene is necessary in all cases, to keep the patient out of the clutches of the quack on the one hand and to assist in a cure on the other. The slighter grades of varix will be found to disappear on the removal of the inducing conditions. Such cases as already indicated, should really be termed spermatic congestion—they disappear on removal of constipation and regulation of the sexual habits. Marriage, if practicable, is the best remedy. All authorities unite upon the importance of attention to the bowels. Should the patient experience a dread of impotence, some pains should be taken to correct his morbid impression, else the prospect of matrimony is apt to be distasteful to him. In all cases, whether marked or slight, due attention should be given to measures tending to restore constitutional tone. Exercise short of fatigue, proper hours of rest, avoidance of sexual excess and the use of the shower-bath are essential. Regulation of the diet and temperate habits do much to assist in a cure. In recommending exercise the patient should be warned against

violent strains as tending to increase the varix and favoring hernia and hæmatocele. He should also be advised to wear either a suspensory or a "jock strap" while exercising.

If varicocele be associated with frequent pollutions or spermatorrhœa, it may be necessary to adopt some of the various measures of treatment for these conditions. If there be hypochondriasis or neuralgic symptoms it is advisable to pass a cold sound occasionally. The results of this simple measure are often remarkable, the morale of the patient being improved to a wonderful extent. This effect is due primarily to the peculiarily stimulating effect of distention of the urethra upon the central sympathetic system, as well as to a certain moral effect. The latter effect is usually accorded too much importance, and the physiological effect incidental to the stimulation by stretching of such regions as the urethra, cervix uteri, anus and rectum is forgotten. The application of astringent ointments or suppositories to the prostate is often of great benefit.

In the correction of constipation, mild laxatives and not drastic purgatives should be given. Remedies which tend to relieve hepatic congestion or torpor are always in order. Theoretical considerations aside, there is no better remedy than minute doses of calomel. The tablet triturates in doses of $\frac{1}{10}$ to $\frac{1}{5}$ gr. at bedtime are a favorite with me. One who has never used them will be convinced by their action that he has a great deal to learn regarding the use of this much-abused drug. Of the various tonics, non-constipating preparations of iron, strychnia and the mineral acids are serviceable. A very satisfactory tonic is the new preparation of "the three chlorides" of iron, mercury and arsenic, manufactured by Renz & Henry, of Louisville. I began using this preparation at the suggestion of Dr. J. R. Larrabee, and it deserves all that he says of it.

Remedies which are supposed to act directly upon the vascular walls have been highly recommended in varicocele. Agnew endorses ergot very highly. As far as diseases

affecting the veins are concerned, I have more faith in hamamelis than in ergot, but neither of these drugs is apt to produce much benefit in varicocele;—this is readily understood on dissection of the flabby, degenerated mass of veins composing the varix.

The application of cold to the part is a time-honored remedy in varicocele; douching the scrotum with cold salt water is an excellent adjuvant to other measures in all cases, but in the severe forms it is not likely to accomplish much. The addition of astringent drugs to the water used for bathing the parts is endorsed by high authority. Such a measure is a little absurd to say the least. Mechanical measures are sometimes employed for the purpose of exciting contraction of the dartos muscle, in the hope of thereby impressing the varicocele. Flagellation for fifteen or twenty minutes with a wet towel or with rubber tubing has been recommended.

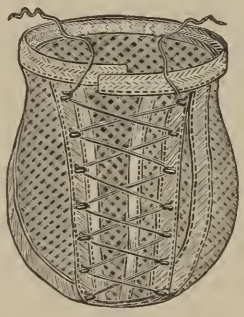
Support of the part by some mechanical device is the most familiar method of treatment of varicocele. A simple but troublesome method is that of the application of adhesive plaster (Morgan's method). The affected side is encircled with strips of stout plaster, while the scrotum is elevated. A loop of plaster is now applied vertically over the encircling strips, and through this loop a piece of bandage is passed, its ends being attached to a waistband. The varicocele is thus elevated and theoretically drained of blood. The angle produced in the efferent veins, however, nullifies the possible benefits of the method.

The suspensory bandage is an every-day method of treatment, but after all it is on the average carelessly selected and still more carelessly used. Most of the flimsy devices for suspending the testes, are worse than useless. A suspensory should fit accurately and should keep the parts well up. The surgeon should not leave this to the appliance dealer, but should attend to it himself. A suspensory should be light, firm, and easily adjusted. Silk and rubber

tissue are too heating and not very durable; they are also quite expensive if well made. The U. S. Army suspensory, known as Rawson's, is superior to all others in the market. Morgan's suspensory is highly endorsed. This is laced in front. The tumor being lifted and drained of blood is placed in the bag and the laces carefully adjusted. A form of suspensory has been recommended, which is to be elevated and fastened to a waistband by a strap and buckle, as described in the application of adhesive strips. To this, the same objections may be urged as in the case of the plaster.

Infibulation of the scrotum has been recommended. The best appliance for this purpose is the soft, silver ring

FIG. 2.



Carroll's modification of Morgan's Varicocele Compressor.

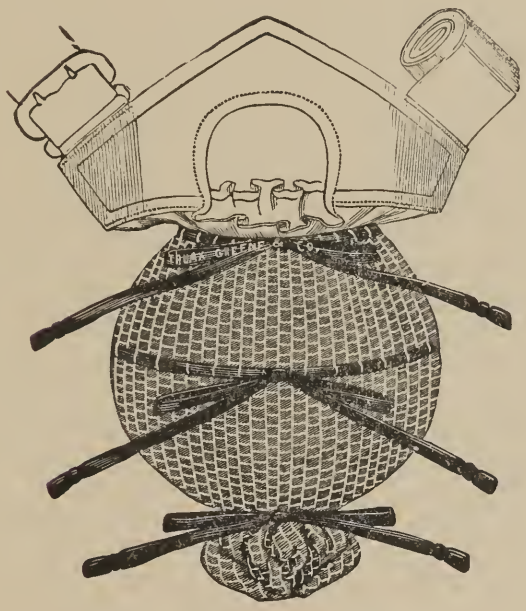
devised by Wormald. This ring is covered with soft leather or rubber. The varicocele is emptied of blood and the scrotum drawn through the ring, which is then compressed to a degree just sufficient to prevent the veins from refilling. The principal objection to this appliance is the irritation and occasional ulceration of the scrotum which it is apt to induce. Few patients will tolerate it. Curling reports a case of Coulson's in which this appliance caused sloughing of the scrotum.[1]

Pressure upon the spermatic veins at the external abdominal ring has been recommended, the object being "to

[1] Diseases of Testis, 4th Ed.

direct the blood back into other and smaller channels than the spermatic veins.[2]" Various trusses have been devised for this purpose. Stephen Smith asserts that this method will cure severe forms of varicocele.[3] Gant states that a truss sometimes cures, but that occasionally the veins have enlarged as a consequence of the method.[4] A truss is not

Fig. 3.



Miliano's Varicocele Compressor.

only difficult to adjust with the proper degree of pressure, but defeats the object for which it is intended. The pressure enhances the already existing spermatic congestion, never completely shuts off the backflow of venous blood, and affords absolutely no support to the weakened and dilated vascular walls. It is but just to state, however, that Cur-

[2] Agnew. Surgery, vol. II. p. 565.

[3] Op. of Surg. p. 273.

[4] Surgery p. 1081.

ling and, later, Ravoth and others endorse the truss treatment.

Landerer explains that extirpation or obliteration of varicose spermatic veins is apt to be followed by relapses. In one of his cases of recurrence he obtained an excellent result by letting the patient wear a hernia truss with movable pad, according to the method of Ravoth. One and a half years after application of the truss the varix had disappeared completely, and after wearing it for a year longer it was left off, and since eight years there had been no return of the varicocele. An equally successful result was obtained in three other cases. He claims that the truss acts as an artificial substitute for the valves of the veins which have either completely disappeared in the varicosities or are in a rudimentary condition. This procedure is also applicable to varices of the lower extremities. For this purpose the author makes use of an apparatus consisting of a curved spring and a pad filled with water, which is made to press directly upon the saphena vein. He has employed this truss in eighty cases with very satisfactory results. Its application is much more agreeable to the patient than bandaging, and it is much cheaper than an elastic stocking. Under the use of the apparatus a reduction in the size of the limb has been observed, but the treatment is regarded as palliative rather than curative.[5]

Bennett puts the case of the truss concisely and pertinently as follows:

"Curling speaks of varicocele entirely disappearing during the use of the truss; personally, I have seen no such case, although in one instance which was under my observation there certainly appeared to be for a time a slight decrease in size, but the improvement was not permanent.

"If a hernia co-exists, the use of a truss is naturally indicated, but in the majority of such cases occurring in healthy

[5] Deutsch. Medizin. Zeitung No. xxxv. 1891.

subjects an operation for the radical cure of both conditions is probably a justifiable and more rational proceeding.

"If a truss be ordered for a case of varicocele it should fit most accurately; the spring should be of very moderate strength, the pad small, and made of some hard material, such as vulcanite or boxwood. Any slight benefit thus obtainable is entirely outweighed by serious disadvantages. I have, for example, seen thrombus occur as a direct result of the pressure of a truss. Testicular pain may also be produced, and cases of actual wasting of the testicle from the same cause have been recorded."

Electricity has its advocates in the treatment of varicocele. Beyond a certain amount of circulatory stimulation induced by the faradic current, I consider electricity absolutely worthless.

Treatment by Coagulation, Electrolysis and Caustics.

The various palliative measures which have been suggested are usually sufficient to relieve the symptoms and prevent an increase in the size of the varix in cases of moderate severity. In the more severe cases, however, the characteristic changes in the vascular walls, due mainly to a loss of tone and connective tissue proliferation, go on and we have an increase in size of the varix, with consequent aggravation of the symptoms. In the more marked cases the physical deformity is apt to be considerable and may occasion great annoyance. Some men, however, are not hypersensitive, judging by the exhibitions which one may often observe on the street-cars. During the seasons when tight pantaloons are in fashion, Comstock should be kept busy. In large varicoceles the suspensory bandage fails to prevent noticeable deformity, and the consequent failure to relieve the mental symptoms is especially pronounced. In adjusting

his bandage the owner of a varicocele is made painfully cognizant of his deformity. The knowledge that he is unlike other young men as regards his sexual apparatus is apt to have a peculiarly demoralizing effect. The various symptoms of a subjective character that have already been enumerated demand relief of a more substantial character than palliative measures afford. If impotency exist, the matter is of urgent importance, especially where perpetuation of family is of moment.

The principle of direct coagulation has been applied to the treatment of varicocele. Two methods have been employed, viz.: 1, the injection of various substances into the veins by means of the Pravaz syringe; and 2, the electrolytic current. Various fluids have been used for the injection method.

Bernard is an ardent advocate of the electrolytic method.[6] Osborn employs acupuncture for the purpose of obliteration of the veins.[7]

Richet cauterises the varicocele by means of a special apparatus. He seizes a portion of the scrotum and includes the veins in a pair of specially devised forceps, and then cauterizes the included area.[8]

Personally, I have little faith in the virtues of electrolysis in varicocele, and am rather skeptical regarding its safety. This applies also to the methods of Osborn and Richet. Future observation, however, may prove electrolysis to be a valuable method of treatment.

Of all the methods of treatment which have been suggested, that by hypodermatic injection with various chemicals appears to me to be the most painful, worthless, illogical and dangerous. I have done very little experimenting in this

[6] Bernard. Contribution à l'étude du traitement du varicocèle par l'éctrolyse. Thêse de Paris 1880.

[7] Treatment of varicocele by acupuncture of the spermatic veins. Brit. Med. Jour. 1880.

[8] Pique. Revue de Chirurgie 1886.

direction, and I have found that either the patient or myself was very glad to quit in every instance.

Ergotine,[9] solution of persulphate of iron, iodine, carbolic acid[10] and hydrate of chloral[11] have each had their advocates and their trains of disgruntled patients. Even poor old alcohol has been appealed to for a cure, a Russian with the euphonious cognomen of Duhonovsky being the guilty party.[12]

The possible dangers of the injection method are obvious: Cellulitis, sloughing, orchitis, tetanus, phlebitis and septic infection are all within the range of possibilities.

In the *Chicago Medical Times* for August, 1883, appears a paper by Dr. A. L. Willard upon the subject of varicocele, in which that gentleman claims to have obtained astonishing results from Porta's method of the injection of hydrate of chloral in varicocele, at the same time deprecating all operative procedures, properly speaking, for the relief of the affection. Three cases are cited in which a radical cure is said to have resulted from the hypodermic injection of what, I infer, was a saturated solution of chloral hydrate, twenty-four grains of which were injected "beneath the covering of the tumor."

While I have no personal experience with Porta's method, I am of the opinion, from my knowledge of the structure of a varicocele, that this method is both fallacious and dangerous. The uncertainty of the action of chloral upon the heart and nervous centres is well known, and if by injection beneath the "covering" of the varicocele, the writer quoted means injection into the substance of the varicocele, he certainly assumes a grave responsibility in thus recklessly throwing twenty-four grains of chloral into

[9] Bartarelli and Citaglia. Ashurst 1077.

[10] Leonard Weber.

[11] Negretto. Deux cas de varicocèle guérison au moyen d' injection intra veineuse de chloral Gaz. Med. Padone 1882 XXV.

[12] Ashurst. 1077.

the venous circulation, and this aside from the risk of exciting phlebitis. If he means merely injection beneath the skin and into the cellular tissue, he assumes the risk of exciting severe cellulitis and sloughing of the scrotum.

The evil effects of irritant injections into these structures are so well-known that it would seem hardly necessary to call attention to them. Let one have practical experience with a single case of scrotal cellulitis, and he will have great surgical respect for that locality. Cases are quoted by various authors in which injections for the radical cure of hydrocele have been followed by the most dire results from the accidental escape of a few drops of the tincture of iodine into the cellular tissue of the scrotum.

Bonnet, Philipeaux and Rigaud used Vienna paste and chloride of zinc to the scrotum to produce a radical cure, and claim to have obtained some good results. It is not necessary to comment upon this method.

CHAPTER VII.

Radical Operative Treatment.

I do not wish to be recorded as advising indiscriminate operation in varicocele, but I do claim that a certain proportion of cases demand operation. I think, moreover, that this proportion is larger than is usually believed. The dogma of infallibility, which surrounds the teachings of the surgical authorities of the past with a halo of intolerance, has so far infected the practice of the modern surgeon, that he usually discountenances any and all operative measures in varicocele—which in his eyes at least is a surgical *noli me tangere*. Van Buren was strongly opposed to all operative methods in varicocele, and his teachings have done much to prevent surgical interference in these cases. It is a common experience for the surgeon who is willing to operate in suitable cases, to be criticised by the majority of his brethren to whose attention the particular case chances to be brought. Most of the criticism comes from men who not only have never performed an operation for varicocele, but probably have never seen one performed. As conservative a surgeon as Segond, who claimed that in the majority of cases operation was unnecessary, said that "operation is certainly pardonable when the inconveniences of the condition are greater than the dangers of intervention."

Admitting that the large majority of cases of varicocele may be satisfactorily temporized with, it is certainly not overbold for one to advocate operative measures in some of the severe cases that come under our care, the more especially as operation nearly always relieves the pain which so

frequently exists. If, moreover, a method of operating be practicable that is perfectly safe, there can be no objection to operation even in cases of moderate severity. As Wickham remarks, "the facts prove that large varicoceles may lead to serious consequences, such as hæmatocele and phlebitis, spontaneous or traumatic." This point is worthy of attention in considering the justification of an operation.

Indications for Operation.

The indications for operation in varicocele may be formulated as follows:

1. When the varicocele is very voluminous and a cause of marked deformity.
2. When the varicocele is very painful, or is the cause of reflex neuralgia of a severe type.
3. When aberration of the sexual function exists.
4. When irritation of the scrotum is marked and obstinate.
5. When the varicocele interferes with the occupation.
6. When the affected testicle is atrophying.
7. When the opposite testis is diseased.
8. When symptoms of mental aberration are pronounced.
9. When the varix is an obstacle to entering public service—military, naval or civil.
10. Cases of double varicocele where there is danger of serious impairment of the sexual functions. In such cases only one side should be operated at a time, as it would prove very embarrassing should the function of both testes be destroyed after operation.
11. When operable hernia or hydrocele exists and it is desirable to operate on both at once.
12. Rapid increase in size.

The contra-indications as formulated by Bennett are:

a. Co-existence of abdominal tumor.

b. Organic disease or persistent organic disease of the liver.

c. Heart disease.

d. Recent thrombus.

e. Neighboring inflammation. *e. g.* Epididymitis.

f. Disease of testicle.

g. Advanced hypochondriasis, melancholia, monomania or other mental aberration.

Methods of Operation.

An operation having been decided upon, it remains for us to select the method. Before advocating any particular operation, I will endeavor to present briefly and fairly the principal operations which have been recommended.

The operations by castration, resection of the vas deferens and ligature of the spermatic arteries are unworthy of notice.

Vidal's method: One of the earliest operations was that of Vidal de Cassis.[1] This method consists in passing an iron pin through the scrotum between the vas deferens and the enlarged veins. A silver wire is then passed along the pin outside the veins, which are thus included between the pin and the wire. The wire is now fastened to the ends of the pin, and the latter twisted so as to bring a certain amount of pressure to bear upon the vessels (*enroulement*). The twisting process is repeated every day or two until the veins ulcerate through and the pin becomes loose; pin and wire are then withdrawn. The veins are thus cut across and obliterated by inflammatory adhesions. This is the principle involved in all methods of deligation in varicocele. Bradley modifies Vidal's operation by using a second pin instead of

[1] De la cure radicale du varicocele par l'enroulement, etc., 1850.

a wire, thus obliterating the veins by acupressure. Markoe modifies it by dispensing with the pin and using a loop of silver wire clamped to a lead plate. The wire is gradually tightened.

Ricord's method: This is practically the parent of the methods of subcutaneous deligation. Two double ligatures are introduced through a single opening through the scrotum. One double ligature passes above the veins (between the veins and the vas deferens) and the other below them. The loop of one ligature and the two ends of the other project at each opening. The free ends are now threaded through the corresponding loops and made fast to a small yoke provided with a screw. This is tightened from day to day and the loops thus drawn into the scrotum so as to eventually strangulate and cut through the enlarged veins. The ligatures come away in the second or third week.

Wood's modification of the Ricord operation consists in the application of a single subcutaneous ligature of annealed iron wire. The ends of the loop are fastened to a light steel spring, the constant tension of which cuts off the veins. A piece of adhesive plaster should be placed under the spring to prevent its cutting into the scrotum, and over all an antiseptic wool-dressing may be applied. (DeWitt-Boyd.)

Davat's operation: This method is strongly endorsed by Agnew, who claims that he has seen no bad results from it in twenty years' experience.[2] According to this author none of the many imitations of Davat's operation are simpler or more permanent in results.

The hair is first removed from the scrotum. The cord is next grasped between the thumb and index and middle fingers, about one inch below the external abdominal ring, and rolled about until the vas deferens has been isolated and slipped behind the remaining constituents of the cord. A stout acupressure needle is now thrust between the duct and the veins, and along it is passed a needle armed with a

[2] Agnew, Surgery. Vol. II. P. 566.

stout, well-waxed hempen ligature. This traverses the scrotum in front of the veins and passes out of the distal needle puncture. The loop of the ligature is now slipped over one end of the pin and its free ends tied over the other. The entire ligature now slips within the integument and becomes subcutaneous. A cork is now placed upon the sharp end of the pin, and the scrotum kept elevated on a small cushion. The pin should be removed on the seventh day. In this method it is not necessary to wait until the veins are cut through before removing the pin. A suspensory bandage should be worn for two or three weeks.

Bryant's method: This method is as follows: The vas deferens is pushed aside and a stout needle armed with a ligature is passed through the scrotum beneath the veins. A needle set in a handle is next passed through the same opening and made to traverse the scrotum in front of the veins, emerging at the point of exit of the first needle. The distal end of the ligature is now threaded to the eye of the second needle and drawn back out of the wound of entry; the loop is thus made to include the dilated veins. The skin at the entrance and exit is now divided with a tenotome and the ligature tied tightly, its loop becoming subcutaneous. A second ligature is now applied above or below the first in a similar manner. The included area of veins may be divided subcutaneously, if required. Of late years Bryant has not divided the veins. Great success and safety is claimed for this operation.

Erichsen's method: Erichsen makes an incision about half an inch in length in front and behind the scrotum. A needle armed with a silver wire is now passed into the anterior incision, between the vas deferens and veins and out of the posterior opening. The needle is now returned in front of the veins so that they are included in the loop of wire. The ends of the loop are now twisted so as to constrict the veins; the twisting is repeated daily until the veins are cut through and obliterated.

Gould's method: This method is rather novel: This operation is as follows: The vas deferens and veins are separated high up: the skin is now pinched up and transfixed by a small, narrow-bladed bistoury or tenotome and a small opening thus made. A needle armed with stout platinum wire is now passed under the veins which are lifted out of the opening. The wire is now fastened to the ecraseur handle of a cautery battery. The wire is heated to a cherry-red heat and speedily cuts through and at the same time seals the veins. Great caution is necessary to avoid cutting the veins too rapidly and thus causing hæmorrhage. Gould reports twenty-five successful cases. The same measures of rest, antisepsis and support of the part are necessary as in other operations. The obliteration of the affected veins by the galvano-cautery, was first suggested by Dubreuil, a French surgeon.

Gross' operation: This consists of subcutaneous ligature with a stout cord or silver wire. This is passed by means of a long spear-shaped needle. Pancoast fastens the ends of the ligature to a broad button, while Gross in the original method used a compress of cork. The ligature is tightened, or in the case of wire, twisted every day until free.

The late Dr. Levis advised tying the ligature over a section of stout rubber-tubing to obviate the necessity of tightening from day to day. The elasticity of the tubing affords the necessary traction.

T. Holmes' method: This involves cutting down upon the venous plexus by a very small incision and tying the veins with kangaroo tendon. The wound is then made practically subcutaneous by antiseptic dressings. The tendon is eventually absorbed.

Keyes' method: This is one of the best of the subcutaneous operations. The scrotum is shaved and scrubbed first with soap and water and then with bichloride solution. A few drops of a 4 per cent. cocaine solution are now injected

at the point of proposed puncture. Anæsthesia is not advisable, as the operation is best performed in the standing position. A specially devised needle is now passed between

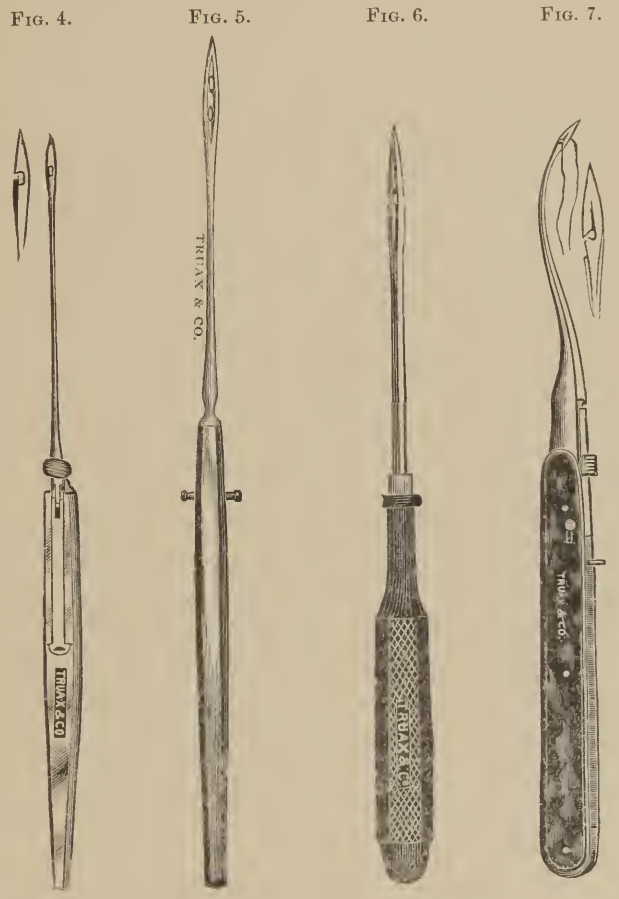


Fig. 4.—Keyes' improved needle for varicocele. Fig. 5.—Keyes' varicocele needle, plain. Fig. 6.—Whitehead's varicocele needle. Fig. 7.—Reverdin's needle.

the veins and the vas deferens, high up. This is armed with an aseptic silk ligature. As soon as the needle emerges posteriorly, the loop of silk is seized and secured and the

needle withdrawn far enough to allow the veins and vas to come together, after which it is passed in front of the veins and out of the posterior opening. The second loop is now secured and the needle withdrawn. The free ends of the loop are now tied tightly and allowed to sink into the scrotum. An antiseptic dressing is applied and the patient put to bed. Keyes claims that ten days is the longest period of confinement to bed. One patient, he claims, was about in 48 hours. Weir advocates the Keyes method.

Alexander Ogston, of Aberdeen, advocates subcutaneous ligation with silk, the operation being practically the same as that of Keyes.

Mr. Lee's methods: Henry Lee has practiced several different operations. His acupressure method is as follows: The veins are separated from the vas deferens and two pairs of stout straight needles are passed through the scrotum, one needle of each pair passing between the veins and the vas deferens, and the other outside the veins, which are compressed between the two. The veins are thus acupressed at two points. The two pairs of needles should be about one inch apart. The ends of each pair are fastened together by elastic bands, thus insuring continuous compression. The veins are now divided subcutaneously with a tenotome.

Should bleeding follow, a third pair of needles should be introduced—below, if the bleeding be venous; above, if it be arterial. Lee's open operation consists in the excision of a section of the scrotum, the application of ligatures a short distance apart, and excision of the included area of veins. Of late, Lee has applied temporary compression; excised the desired area of veins, and finished by sealing the cut ends of the vessels with the cautery. Antiseptic dressings are of course essential to success. Ashurst has modified Lee's first method by passing harelip-pins and loops of silver wire subcutaneously. The elastic bands are substituted by silk ligatures which are removed the next day.

A. E. Barker's method: (so called). This consists in

the application of subcutaneous antiseptic silk ligatures at one or two points.

Barwell's method: This comprises the subcutaneous application of a silver wire in the usual fashion. The loop may be drawn into the scrotum or left outside; in either event the free ends are twisted from day to day until the wires are free, when they are removed.

Annandale's method: This is essentially the same as that of Lee, with the exception that the veins only are excised, the scrotum being left intact. Howse and Banks endorse this operation.

Bogue's method: This consists of exposing the veins and applying catgut ligatures at various points.

Curling's method is essentially that of Davat; it differs only in the use of two pins and the division of the veins between the pins with a fine thin-bladed tenotome.

Howse's method is as follows: The parts having been shaved and rendered aseptic, an incision one and a half to two inches long is made over the varicocele, beginning one-half inch below the external ring. The veins are exposed with as little disturbance of surrounding parts as possible. An aneurism needle armed with chromic gut is now passed at each angle of the wound, the ligatures tied and the included section of veins excised with a pair of blunt scissors. A horse-hair drain, horse-hair sutures, iodoform and antiseptic gauze dressings complete the operation. The horse-hair drain is removed on the fourth, and the sutures on the eighth day. Redundant scrotum may be excised or enlarged scrotal veins tied in this operation if required. As an illustration of the variance of opinion regarding this method, Jacobson terms it the safest and best of all methods and asserts its freedom from danger,[3] while Holmes says that it is a severe operation which has been followed by dangerous hemorrhage, gangrene of the testis and severe and extensive suppuration.[4]

[3] W. H. A. Jacobson—Operations of Surgery.

[4] T. Holmes—Surgery.

Kocher ties the veins at two points and divides the veins subcutaneously. Briggs, of Nashville, practices a similar method.

Treves' operation consists of an incision one inch in length, exposure of the veins, the application of two ligatures and the excision of the enclosed area of veins. A drainage-tube of small caliber, and antiseptic dressings com-

FIG. 8.

Case of extreme elongation of scrotum before operation. (After Horteloup.)

plete the operation. This is another operation illustrating the amount of originality necessary to immortalize an operator.

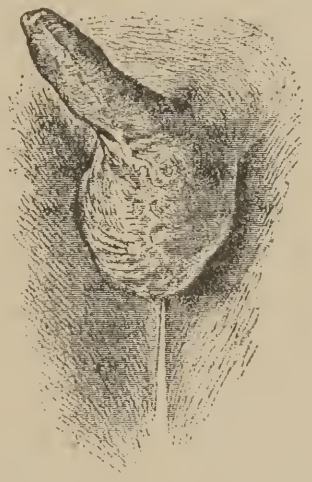
Weir's method is not claimed by him to be the acme of originality. In this respect Weir differs from the majority of operators. Weir states that Gagneles was the first to practice ligation, silk being the material used. He also

refers to Washburne's and Tufnell's suggestions of the use of a third wire in Wood's operation. Weir prefers the subcutaneous application of carbolized or juniperized catgut; twenty-two cases are reported, of which only six were unsatisfactory. The average confinement to bed was eight days.

Excision of the veins was first practiced by Patruban in 1870, and revived by Nebler in 1880. Following these the operation was practiced by Nicaise, Zesas, Lee and others.

Reginald Harrison ligates the large vessels separately and cauterizes the smaller ones.

Fig. 9.



Case of extreme elongation of scrotum after operation. (After Horteloup.)

Abbe of New York has practiced resection of the scrotum with the application of several ligatures at various points in the exposed veins. He reports six cases with excellent results.

Sir Astley Cooper's operation: This is the parent of all operations involving excision of the redundant scrotum. In this operation a portion of the redundant tissue is grasped between the fingers and excised with knife or scissors.

Hemorrhage having been checked, the edges are stitched with interrupted sutures and—nowadays—antiseptic dressings applied. Van Buren characterized this operation as the only justifiable procedure in the vast majority of cases of varicocele.

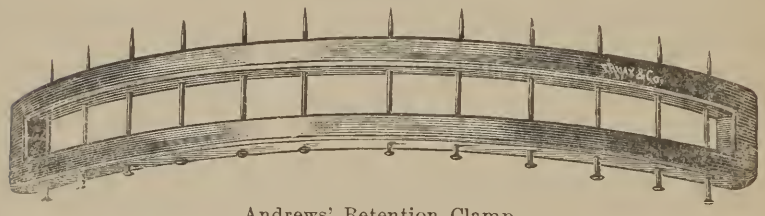
Horteloup's modification of the Cooper operation involves resection of the redundant scrotum with resection of a portion of the veins behind. This operation is practiced by De Wenter and Theophile Anger. Horteloup uses a specially devised clamp. Another operation attributed to Horteloup consists in seizing the mass of veins with large curved forceps, and excising them en masse, at the same time removing a portion of the elongated scrotum.

Hutchinson practices the open method of deligation; Rigaud and Senn advocate the ligature, the latter tying at two points; neither of these operators excises the veins.

M. Lucas Championniére and Le Dentu both practice scrotal resection, the former, however, using no clamp. Le Dentu excises the retro-deferential plexus.

Andrews of Chicago is the originator of a clamp (or retentive compressor) for excision designed to obviate injurious pressure on the tissues during the operation.

Fig. 10.



Andrews' Retention Clamp.

Henry's operation is in my opinion the best of the single operations in selected cases. I was formerly inclined to endorse all that Henry claims for it, but I have latterly modified my opinion and consequently my practice, as will shortly appear.

Henry's method is a systematic modification of the old-time procedure of Astley Cooper, with the addition of modern aseptic and antiseptic precautions and dressing. The operation is performed with the aid of a specially devised clamp, and with a little experience is as rapid and as simple as may be.

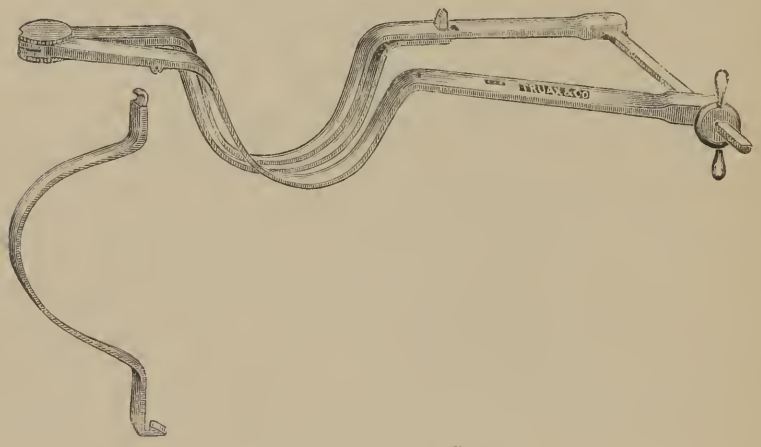
The scrotum, pubes and thighs should be shaved and well scrubbed with soap and water, followed after drying with solution of the bichloride. The clamp is then applied from above downward, care being taken to depress it well down toward the perineum, and to have the raphé of the scrotum exactly in the centre of the condemned portion of tissue. The scrotum is drawn through the blades of the clamp until the testes are drawn up tightly against the pubes, and the screw tightened so that the clamp firmly grasps the skin. Carbolized silk or catgut sutures are now inserted less than one-half inch apart, or a number of harelip pins passed through the scrotum just above the main blade of the clamp, about three-fourths of an inch apart, with intervening sutures. The sutures or pins having been adjusted, the redundant tissue is cut away with scissors or knife. The secondary or removable blade of the clamp is now removed and the sutures loosely tied. The entire clamp is now removed, and as soon as all hemorrhage has ceased the sutures are permanently tied and antiseptic dressings applied. There are some details which I consider all-important that will be mentioned later on.

There is one point upon which Henry insists, in which I endorse him most heartily, viz., "there is more danger of taking away too little than too much scrotum." I will add that in my opinion it is well-nigh impossible to get away too much tissue where the clamp is used. An important feature of the structure of this region is the readiness with which the integumentary tissues of the inner aspect of the thighs may be drawn over, thus assisting in forming a covering for the testes.

The operation of resection in suitable cases is followed by relief of pain, and an improvement in the consistency and volume of the affected testis. Wickham claims that he has relieved pain by resection after Vidal's method had failed.

Wickham of Paris, uses Horteloup's modification of Henry's clamp, which is intended to accurately indicate the proper line of incision. This clamp has a semicircular form in the middle of the blades. I do not like this device as well as that of Henry. Henry's operation may be modified

FIG. 11.



Horteloup's Scrotal Clamp.

by the use of the quilled or shotted suture if the operator so chooses.

Wickham has recently reported the remote results of a series of five cases of varicocele operated upon in 1885.[5] He still claims the best possible results and asserts the superiority and safety of scrotal resection as compared with operations involving a direct attack upon the diseased veins. He insists on the removal of a large amount of scrotum, and states that this is impracticable with ordinary clamps. He adds, regarding contra-indications for the operation, that

[5] Th. de Paris, 1885.

resection of the scrotum should never be performed where wearing a suspensory tends to increase pain.[6]

As an illustration of the extreme degree of elongation of the pendulous scrotum, and the large amount of tissue requiring removal in some instances, I append cuts of one of Horteloup's cases before and after the operation of resection. (Figs. 8 and 9.) There is one fact which to me appears very plain from these illustrations, and that is that insufficient tissue was removed. I should be greatly pleased to know the condition of this patient some years after operation, for in cases with such extreme elongation of the scrotum there is a marked tendency to recurrence, if resection alone be depended upon. In my own cases of recurrence the testes after operation were drawn up very snugly and the scrotum did not approximate so nearly the contour of the normal scrotum as is seen in the appended illustration of Horteloup's case after operation.

I greatly regret my inability to present illustrations of several of my cases of resection of the scrotum, showing their condition some years after operation. It might be urged that I did not remove sufficient scrotum, as an explanation of the recurrence in my cases. I have elsewhere expressed myself upon this point. I have the good fortune to possess a photograph of a case in which a surgeon of national reputation performed scrotal resection seven years ago. This surgeon reported this case as radically cured. The cut herewith appended casts an element of doubt upon the claims of the operator—a doubt which approximates conviction in the mind of the patient. (Fig. 12.)

Bennett's operation of resection of the veins and shortening of the spermatic cord: This is one of the latest of the systematic surgical procedures for the relief of varicocele. It is described by its originator as follows:

"The patient having been anæsthetised, the veins are made prominent and put somewhat on the stretch by grasp-

[6] Revue générale de clinique, 9 décembre, 1891.

ing the varicocele between the fingers and thumb of the left hand, care being taken at the same time that the vas deferens is pressed back out of the way of harm. Through the skin over the veins thus rendered prominent an incision is made which in no case need exceed an inch in length. One or two touches of the scalpel will now suffice, the veins being pressed well forward to expose the thin fascia (immediately

FIG. 12.

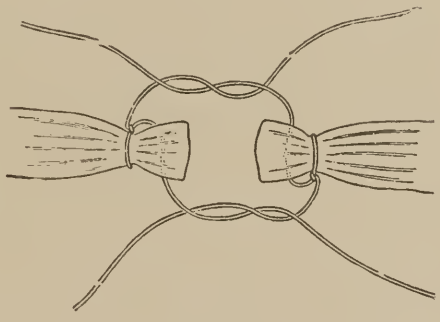
Varicocele seven years after resection of scrotum.

surrounding the varicocele) through which the vessels can be clearly seen. The knife is now laid aside, the veins not having been actually denuded.

"By means of an aneurism needle or eyed-probe, a thoroughly carbolized tendon is passed round the fascia referred to with its testis, as is thought proper; it is then securely tied, the ends being left long. The varicocele above this ligature is then freed, together with its sheath, from the

surrounding parts by a few sweeps of the finger for a distance sufficient to allow of the length previously decided upon in the manner indicated above, as appropriate for excision to be drawn out of the wound. A second tendon is now passed around the upper end of the freed veins, as near the external abdominal ring as practicable, and tied in single knot only, which is kept tight by an assistant. The portion of the varicocele included between the ligatures is divided, above and below, about a quarter of an inch (not less) from the corresponding ligature, and removed. The upper ligature is then finally tightened and its knotting completed, the ends being left long as before. The wound having been freely

FIG. 13.



Bennett's method of approximation of the stumps.

irrigated with warm sublimate solution and all bleeding (be it ever so slight) arrested, one of the ends of the ligature, above and below, is threaded on a needle, and passed through the corresponding stump between the cut end and the ligature, in the manner shown in the diagram.

"The stumps are then brought together and kept accurately in contact by knotting the ends of the upper ligature to those of the lower.

"Finally, the ligature ends are cut short and the operation is completed. The edges of the skin fall together; there is no need for either suture or drainage tube, and all

that remains necessary is the careful application of the antiseptic dressing.

"The postponement of the final tightening and knotting of the upper ligature, until after the division of the veins, is a point of importance, as there is some risk, if the tying be completed before the division, that the shrinking of the veins which follows the escape of blood contained in them may result in the ligature becoming sufficiently loose to allow of an oozing of blood into the wound, and indeed may possibly, as I have once seen, permit the stump to escape from the ligature altogether, in which case the primary object of this particular operation would be defeated. Every care must be taken to avoid any possibility of oozing into the parts around the stumps, as the formation of a clot in the wound delays the healing, and greatly prolongs the convalescence."

All manipulation of the veins must be confined to the parts lying between the two ligatures, as any injury to the vessels beyond the restricted points, whether above or below, introduces an element of risk, according to its originator. If the details of this procedure, as described above, are carefully carried out, the subsequent course of the case is simple and uninterrupted. In four or five days the wound has, as a rule, healed, and the approximated stumps are surrounded by a mass of exudate. At the end of a week the patient is usually allowed out of bed, and although the swelling about the cord does not entirely disappear for perhaps a month, any ordinary occupation may be resumed in fourteen days or thereabouts. Upon the absorption of the exudate nothing abnormal is perceptible to the touch but a very slight circumscribed hardness which remains permanent around the ligature knots. A suspender is worn up to the time of the disappearance of the swelling, and then finally discarded, leaving the testis well braced up in its natural position, with the scrotum accurately adapted to it, no matter how long and flabby that structure may have previously been. Little or

no pain follows the operation, but during the first fortnight there may be some œdema of the scrotum, and the testis is generally slightly tender. The author has seen no real orchitis, nor has there been, in any of his cases, suppuration about the wound, or any constitutional disturbance. He claims that he is not acquainted with any other method so rapidly producing a "cure" which may fairly be called "radical."

By leaving the sheath of fascia which immediately surrounds the varicocele intact, and including it with the veins in the ligature, two objects are attained in his opinion, viz.: first, the certainty of passing the tendon around all the affected vessels, as none of these ever lie outside the fascia; and second, the prevention of any material chance of recurrence of the abnormally dependent position of the testicle, which is probable if the veins are actually denuded before the ligatures are applied and the stumps brought together in the manner described, since it is manifest that the weight of the testis would tend to drag the veins considerably out from the sheath above; whereas, this fascia, if included in the ligatures, not only obviates this tendency, but, in fact, also carries the weight of the dependent organ without stretching to any appreciable extent, thus rendering the use of a suspender entirely unnecessary, after the approximated stumps have fairly united.

Although at first Bennett employed this operation for very long varicocele only, he has during the last two years used it in every case, irrespective of size, upon which he has operated, even in those which were too small to actually require the excision of any portion of the cord.

The free division of the veins between the ligatures allows any small vein which may by chance lie outside the portion of fascia included to be detected and tied with a fine piece of carbolized catgut, thus insuring greater certainty in the ultimate result, and the reunion of the stumps prevents in the first place the dropping of the testis, which otherwise

occurs when the veins are divided freely, and subsequently obviates the necessity for wearing a suspender, which is such an annoyance to the majority of patients.

CHAPTER VIII.

Methods of Operation Specially Considered.

In discussing the merits of the various operative procedures for varicocele, it is not necessary to take them up in detail; the *raison d'etre* of many of the specially devised (?) and named operations is apparent only to the operator. The indication in all operations is to limit or suppress the circulation in the plexus composing the varix. For practical and clinical purposes the various methods may be divided into 1, Acupressure; 2, Subcutaneous deligation; 3, Open deligation; 4, Deligation with resection of veins; 5, Deligation with resection of scrotum; 6, Resection of the scrotum.

1. The employment of *acupressure* at the present day is an evidence of a lack of faith in modern antisepsis, and to my mind is much like the Dutchman's method of cutting off his dog's tail "an inch at a time so that it wouldn't hurt him so much." Gradual obliteration of the veins by pressure,—with or without ulceration,—has all the dangers of immediate deligation as far as sepsis and trauma are concerned, and moreover, these dangers are continuously incurred from start to finish, whether the process requires a few days or several weeks. I include under the term acupressure all the methods involving gradual obliteration of the veins. The dangers of acupressure are in a measure similar to those of subcutaneous deligation, shortly to be described.

2. *Subcutaneous deligation* is not an essentially dangerous operation in skillful hands. Unfortunately, however, the rank and file of operators are not as skillful as some of

those who claim such extraordinary success with this method. Simple as the various methods of subcutaneous ligation may appear, serious accidents have occurred. The operation is done in the dark, so to speak, and more tissue is included than is essential to the cure of the varix. A certain amount of cellular tissue is certain to be included with the mass of veins, and the strangulation of this tissue is not conducive to safety. The veins also may not be completely strangulated. The following case by McKay illustrates this point:

"In the early summer of 1888 I was called in by Dr. Habib Tubagy of Beyrout, Syria, to operate on Mr. Nasif, an unmarried carpenter of that city. Two days previous to this he had been operated on by Vidal's method, but as there was considerable swelling of the scrotum, and he was suffering much pain, he desired the radical operation by the open method. After thoroughly cleansing the parts, an incision was made similar to, but somewhat shorter than, that in the former case. The wires were found enclosing the blood-vessels and much cellular tissue, and not tight enough to entirely arrest the flow of blood."

A portion of scrotal tissue may be included in the loop of ligature unless great care be taken. The veins being squeezed up *en masse*, there is less security against secondary hemorrhage than when they are ligated separately. Scrotal hæmatocele, phlebitis, septic infection, thrombosis and embolism are possibilities. Regarding the latter, however, it is my opinion that there is more danger of thrombosis and embolism in gradual occlusion of the veins than in their cleanly individual deligation.

Subcutaneous deligation, while not so dangerous in this respect as acupressure and its congeners, is more so than a neat open operation. Strict asepsis neutralizes all possible claims for the timid and haphazard deligation in the dark. Surgeons of some experience have included the vas deferens in the loop of ligature or wire with resultant atrophy of the testis. A case of this kind has occurred in Chicago.

Atrophy of the testis, however, does not necessarily imply inclusion of the vas deferens, as ligation of the spermatic veins alone has produced it. I believe, though, that the danger of atrophy has been overrated. Severe varicocele is attended by atrophy of the testis; sometimes to a marked degree; as the varicocele subsides this degenerate condition becomes apparent. Tetanus is one of the possible results of inclusion of the vas deferens.

Richet, in practicing the method of *enroulement*, has observed that a vein with hardened and thickened walls is occasionally found in the midst of the mass composing the varicocele, which may be mistaken for the vas deferens. He relates a case in which both he and Denonvilliers were in doubt in the performance of Vidal's operation. Richelot cites a similar case.

Many surgeons believe that the chief danger of ligation subcutaneously is inclusion of the spermatic artery, which is deeply situated amid the mass of veins composing the varix. Ligation of this artery, it is claimed, leads to certain atrophy of the testis. This is the opinion of Gosselin, and following him, Levis, Gouley, Jenks, Malgaigne and Henry. Nicaise is also very chary of tying the artery. Malgaigne holds that it is impossible to avoid the artery and that, therefore, subcutaneous deligation is equivalent to castration. Guyon and Richelot claim that the arteries of the vas deferens and cord proper are sufficient to preserve the nutrition of the testicle.

W. H. Bennett remarks on this point as follows:

"1. That the vas deferens having been displaced in the manner usually adopted in operations for varicocele the spermatic artery does not accompany it, but remains with the spermatic veins.

"2. That in cases of varicocele the division of the main trunk of the spermatic artery, together with the veins, if the ordinary principles of surgical cleanliness be observed, is not only harmless to the testicle, but probably aids in the

ultimate relief of the affection by diminishing the pressure of blood going to the testis at the time when almost all the returning veins are suddenly obliterated.

"3. That the division of the deferens, spermatic artery, and spermatic veins, which entails a section of apparently the whole cord, is not necessarily followed by sloughing, or even subsequent wasting of the testicle, provided that a perfectly aseptic condition of the wound is maintained." [1]

With reference to the same subject, A. W. M. Robson says :

"In 1886 I published a series of ten cases of varicocele treated by excision, the operation differing very slightly from that recommended by Mr. Bennett in his paper published in *The Lancet* of Feb. 9, 1889. I have had the opportunity of seeing many of these cases since, and find that there has been absolutely no atrophic change or other apparent alteration in the testicle, and yet in all of them not only was the bundle of veins but a portion of the spermatic artery removed; for it is quite easy, as Mr. Bennett says, to see the open mouth of the artery in the mass of tissue removed, leaving no doubt about its division. In all my cases an aseptic course was pursued, and in none was there any trouble from orchitis." [2]

Sir James Paget reported a case of pyæmia following subcutaneous deligation. Curling spoke of several cases of *enroulement* practiced by Roux, in which death resulted. Thievenow had a case of death from septicæmia. Howe reported a fatal case of peritonitis after ligature. That severe pain and even tetanus should be liable to occur in subcutaneous deligation is not surprising if we take into consideration the numerous and sensitive nerve filaments which supply the involved parts. The inclusion of these nervous structures in the ligature is to a great extent unavoidable. The danger is reduced to a minimum, however,

[1] Lancet, March 7, 1891.

[2] Brit. Med. Jour. March 21, 1891.

by care in separating the structures of the varicocele, and including as little tissue as possible in the ligature.

I do not, however, condemn subcutaneous deligation *in toto*, and have performed it myself a number of times. In proper hands and under some circumstances it is well enough. I believe, nevertheless, that there are better and safer methods.

There is no real necessity for special or complicated needles and other devices in this operation, although some one of them may be used if at hand. Juniperized silk is probably the best substance for ligature.

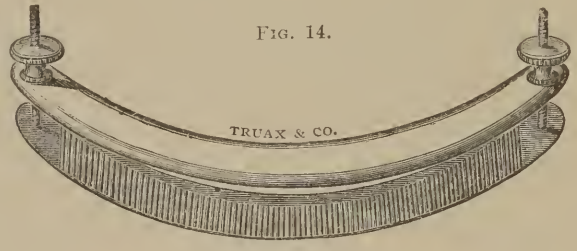
After proper antiseptic precautions the scrotum is gathered up in the hand and transfixed from before backward with a small tenotome; the knife is then withdrawn and the scrotum allowed to drop back in place. A fine stiff probe (eyed) threaded with juniperized silk is now passed through the punctures between the veins and vas deferens, and passed back outside the veins, still carrying the ligature, to emerge at the point of original entry in front. The probe is removed and the ligature tied and dropped. The usual precaution of rest is now taken. Any of the various forms of needles may be used, if desired. The results of subcutaneous deligation, when properly performed, are certainly good, a large proportion of cures resulting. This in a measure compensates for certain undesirable features of the method.

3 and 4. There is little choice between *open deligation without disturbance of the veins and deligation with resections of the veins*, excepting possibly (this being very remote), the additional danger of sepsis in the latter. The value and safety of division of the veins with the cautery wire is as yet unproven, but in spite of the favorable report of its originator,[3] I believe it to be the most dangerous operation yet devised. The dangers of the open method are in a less degree than those of sub-cutaneous

[3] Gould.

deligation, with the exception of that of inclusion of the vas deferens;—this cannot occur. If the open method be selected the point of election should be as high up as possible, and as small an incision made as is practicable to work through. The veins are thus ligated in their straight portion with very little mauling about of the cellular tissue. The higher up the deligation, the less the danger of sepsis, cellulitis and atrophy of the testis, the latter advantage being possibly due to the avoidance of trauma of the smaller veins, upon which we must rely for return circulation after obliteration of the vessels composing the varix. In a general way it may be said that deligation at a single point in each vein is safer than at several points in the same vessel; it is also quite as effectual. The results of the open method performed in this manner are excellent, and the danger under antisepsis is very remote.

FIG. 14.



Lewis' Scrotal Clamp.

5. *Deligation with Resection of the scrotum.*—I consider this to be the ideal operation in by far the majority of cases demanding surgical interference. Much depends on the method of performance;—the important details, as far as the danger to life is concerned, affecting chiefly the deligation. Under proper antiseptic precautions I do not believe that the scrotal amputation complicates, or at least enhances the dangers of the operation. Deligation with resection is indicated where the varix is large and the scrotum very lax and pendulous. The removal of the latter gives the best pro-

phylaxis against recurrence of the varix. The results are likely to be better than those attained by any of the other methods.

6. *Resection of the scrotum* is the safest operation for varicocele, and according to Henry is a radical cure in the true sense of the term. He reported fifty-nine operations some years ago, which as far as he could learn were radically successful. This same operator has since reported a number of cases at various times, for which he claims an equal degree of success. Dr. Henry certainly deserves great credit for perfecting and enthusiastically advancing the claims of the operation of scrotal resection.

In my early experience with Henry's operation I was inclined to accept the statements of the ardent advocates of the method without much question. A wider experience and observation has, however, convinced me that too much has been claimed for the operation. To be sure, as some of its advocates have claimed, it makes little difference if the operation is again necessary after a lapse of years, as the method is perfectly safe; but this is begging the question in regard to an alleged "radical cure." In very large varicoceles the changes in the texture of the venous walls are such that pressure and support alone are insufficient to secure restoration of their natural consistency and caliber, even though the pressure be sufficiently firm and continuous. There is little elasticity in the remaining portion of the scrotum, and the tone of the part is apt to remain as impaired as before the operation,—the same constitutional conditions prevailing. It is my opinion that stretching and relaxation of the new "natural suspensory," or scrotum will recur in the majority of severe cases sooner or later. The varicocele may not be as severe as before the operation and the more urgent symptoms may be relieved, but there is nothing edifying in the spectacle of a good-sized varix a few years, or perhaps months, after a so-called radical cure.

I desire to do the method full justice, however, and am

free to say that the subjective symptoms do not always recur *pari passu* with a return of the varix; but I am discussing a "radical cure" and hair-splitting is unnecessary. The patient is apt to forget the original subjective symptoms and gauge the value received by the ocular and objective evidence at his command.

The history of one of my cases of recurrence is of some interest:

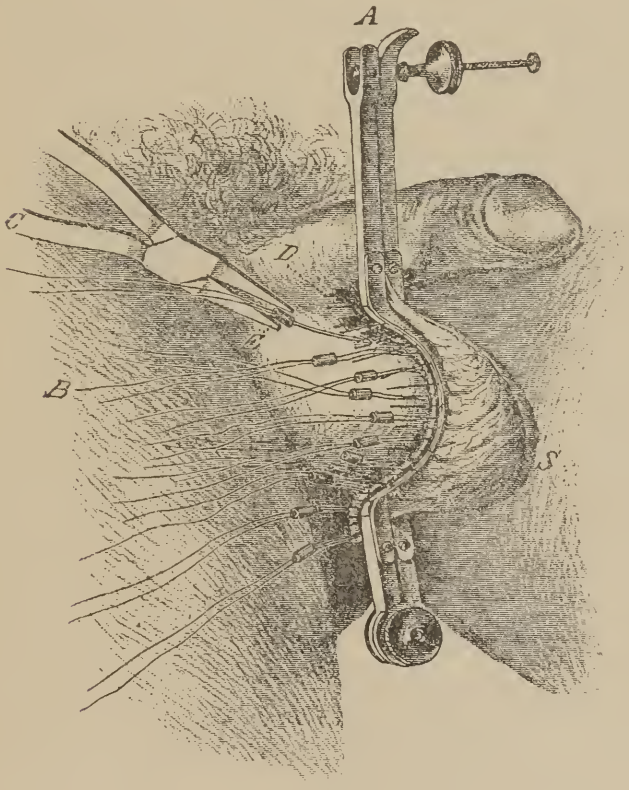
CASE.

An accountant, twenty years of age, presented himself for treatment for an immense varicocele of the left side with moderate enlargement on the right side. The subject had always been delicate and was rather anæmic and cachetic in appearance, this being satisfactorily explained by a very exacting indoor occupation. The heredity was not good, the family being rather delicate than otherwise. There was a history of persistent and frequent masturbation, up to the time when nocturnal emissions became frequent and exhausting, at which time the practice was stopped. An injury of the testes with a base-ball when the patient was a young lad was recalled. Pain in the back and along the cords, both of a neuralgic and dragging character, was severe and annoying. The affected testis was painful at times and constantly hyperæsthetic. There was more or less intertrigo. Hypochondriasis of a sexual kind was pronounced. Henry's modification of the Astley Cooper operation was performed, and as much scrotum as practicable removed. Healing occurred in ten days. All of the symptoms were allayed by the operation for the time being, and for several months the new scrotum did not yield appreciably. Now, however, after the lapse of nine years, the varicocele is about as bad as ever, although productive of little annoyance.

In moderate varicoceles and in quite young subjects the scrotal tissues are apt to retain a certain degree of consistency and elasticity, and the veins have not usually entirely lost

their normal tone. Under these circumstances scrotal resection is the ideal operation. It is far better, in my opinion, for a patient to submit to this operation than to be annoyed by suspensory bandages for the rest of his days. It is safe, when properly performed, and gives an ideal result.

Fig. 15.

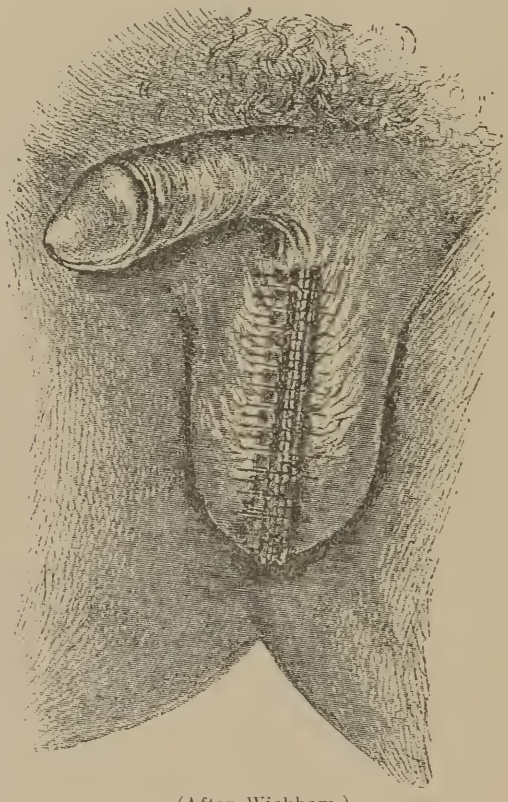


(After Wickham.)

One of the most systematic operations for varicocele is that advocated by M. Edmond Wickham. This surgeon uses the Horteloup clamp and performs the operation with the strictest antiseptic precautions. The novelty of his method consists in his mode of fastening the sutures. The

sutures are passed a short distance apart, and are double; at one extremity they are fastened to a thin strip of lead moulded to accurately fit the curve of the scrotum after its curtailment. The sutures are passed through between the blades of the clamp before its removal. Between each suture

Fig. 16.



(After Wickham.)

is passed a hare-lip pin. Small sections of lead-tubing are passed over the ends of the double sutures, and at the completion of the operation are clamped down firmly in a manner similar to that employed with split shot.

I append illustrations of Wickham's method, not be-

cause I recognize its superiority, but because the cuts represent quite accurately the proper method of application of all forms of clamps and the passage of the sutures. As already remarked in connection with the Horteloup clamp, I am inclined to believe that there is likelihood of too much scrotum being left where this clamp is used for the purpose of outlining the proper amount of tissue for removal.

In describing what I believe to be the ideal method for large varicoceles, it is not my intention to advocate it as a routine practice. The surgeon must necessarily at all times use his best judgment and select the operation apparently best suited to the exigencies of the case in hand.

I will simply describe the method which I believe to be the safest and nearest approach to a radical cure in the vast majority of cases of pronounced varicocele. I shall not follow the usual custom of claiming the method by virtue of some little modifications of technique. As I have already hinted, the *raison d' etre* of so-called special methods usually exists only in the mind of the operator. I do not know whether this particular combination of the old and new is practiced by others, nor do I consider it material to the subject in hand. If it is so practiced the operator is privileged to label it to suit himself, providing he will permit me to use the label.[4]

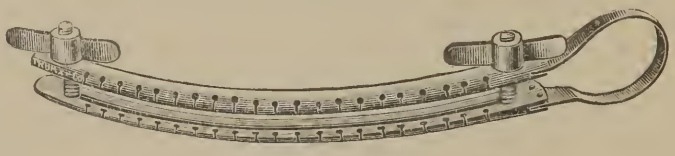
[4] Since this portion of this monograph was written I have noted the following by A. B. Barrow:

"I have simplified the operation of varicocele slightly, by making the incision over the external abdominal ring only, and not extending it into the scrotal tissues at all, as I found that it was quite easy to pull up the veins into this limited opening and ligature them; and in this situation there is no liability to injure the vas deferens, so I have discontinued the use of the pins I then recommended. But I attach the same importance to that point in which I advocated the clearing and ligaturing the veins first at the external abdominal ring, where it is easily done; and, having cut them through, to pick up the distal ends of the veins, and lifting them up to strip off the surrounding tissues of the cord as low as the upper part of the testicle; then apply the lower ligature, cut the veins through again, and allow the testicle, which has been drawn up to the wound, to slip back into the scrotum. In this way I have operated upon a large number of cases, in a few instances removing the veins of both sides at the same operation, and often doing the operation in association with the radical cure of hernia, and I have had unvarying success both

The bowels having been emptied by a saline or castor oil, — the latter being perhaps preferable, — the scrotum, pubes and thighs are thoroughly scrubbed with green soap and bichloride 1-2000 and then bathed with a bichloride solution 1-1000.

This completed the patient is anæsthetized, during which process the scrotum is wrapped in a towel wet with the bichloride solution. It is hardly necessary to say that the operator is now supposed to wash his hands and remove all superfluous subungual organic matter. Everything, including the operator's conscience, being thus prepared, and all instruments having been asepticised by boiling water, an incision one inch or a little more in length is made, beginning just below the external abdominal ring and parallel with the

Fig. 17.



King's Scrotal Clamp.

spermatic cord. This is carried down until the cord and its accompanying veins are exposed. The number of veins varies in my experience; they are here quite straight and when emptied of blood quite small. The cord and veins are hooked with an aneurism needle out of the wound, which is meanwhile occasionally irrigated with bichloride solution; the veins are now separated and several of the larger ones ligated with a single ligature of medium-sized juniperized

as regards the rapidity of healing of the wound, the cure of the affection, and the satisfactory condition of the testicle. Several cases have been afterward admitted into the services.

"I have not found the testicle diminish in size in any case, but, on the contrary, it usually increases. In some cases I have observed that there is a tendency for the tunica vaginalis to become slightly distended with fluid when the patient first begins to walk about, but this condition disappears during the night when the patient is lying down."—*Brit. Med. Jour.*, March 21, 1891.

silk; the ligatures are cut short and the veins and cord dropped back in place. If there is any difficulty in reposition of the cord it is readily overcome by traction on the testicle. The wound is now irrigated and thoroughly dried, towels instead of sponges being used for this purpose. Sponges are far inferior to soft dry sterilized towels for checking oozing and for many reasons to be preferred. Several fine stitches of juniperized silk are now inserted, the wound closed and dusted with iodoform. During the remainder of the operation the wound should be compressed with antiseptic gauze by an attendant. The next step is the application of the clamp—I have used both Henry's and a modification of King's clamp,[5] but any other good clamp will do. (Fig. 17.) Care should be taken to divide each side of the scrotum equally, and to include sufficient tissue in the clamp. As already observed, it is well-nigh impossible to remove too much. I have operated in cases where I have removed the clamp after excision of the scrotum for the purpose of ligating a vessel and have found so little tissue left that I had extreme difficulty in covering in the testes, yet the new scrotum has not only proved sufficient, but I have wondered whether it would not have been practicable to remove more tissue.

It is an excellent plan to insert a few harelip pins beneath the lower border of the clamp before cutting away the scrotum, as the dartos is very elastic, and is likely to retract so that there is too little room for the sutures.

The point of election having been determined upon, the redundant tissue is quickly cut away along the face of the clamp with either scissors or knife. Juniperized silk sutures and harelip pins are to be used and may be inserted either before or after the excision, but always before removing the clamp. There should be as little delay as possible, as the prolonged pressure of the clamp produces more or less bruising of the loose scrotal tissues which is not conducive to prompt union. Three or four pins are usually enough; these

[5] King's clamp is lighter and less bunglesome than Henry's.

should be inserted at equally divided intervals and the silk sutures interposed in sufficient number to prevent gaping and maintain accurate apposition. Henry covers the heads of the pins with sealing wax and embeds their points in small corks.

A plan which is perhaps better, and one which I occasionally practice, is to pass reinforcing sutures of silver wire instead of the pins. A single strand of wire is used and its ends knotted upon small rubber buttons or fixed in split shot. The tension is so extreme that something more than ordinary sutures is required.

The secondary blade of the clamp having been removed the sutures are lightly tied and the main clamp removed. If the sutures be permanently tied before removal of the clamp, the surgeon may have to reopen the wound to tie some spouting vessel. Vessels should be twisted where possible, or traversed by a suture. An assistant must now press back the testes, else they will pop out in a truly demoralizing fashion. I well remember my first experience in this respect. I wondered where on earth I was going to get skin enough to cover those obstreperous appendages.

All hemorrhage having been checked the wound is permanently closed. Too much care cannot be taken in checking hemorrhage, as there is an especial tendency to venous oozing. The formation of a clot beneath the wound will not only prove a source of septic danger, but will prevent speedy union. There is also the danger of serious hemorrhage of a passive character. To one unfamiliar with operations about these parts the tendency to prolonged oozing is peculiar; I have noticed it for several days after a most careful operation for varicocele.

The danger of hemorrhage is in a great measure dependent on the constitutional condition of the patient, as shown in one of my cases.

The occurrence of concealed hemorrhage and formation of clot can be readily avoided by the insertion of a small

drainage tube along the line of suture at the lower angle of the wound. I prefer for this purpose decalcified bone, but rubber will of course answer the purpose.

Henry uses adhesive plaster as an additional support to the wound, but I have found graduated compresses to be all that is required.

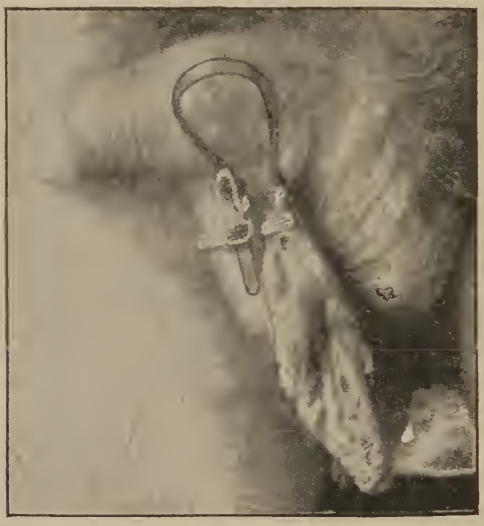
Having closed the wound and made provision for drainage, the parts are irrigated with the bichloride solution, dried, the edges sprinkled with iodoform and a piece of oiled silk or protective laid along the edges to prevent adhesion of the subsequent dressings. A quantity of borated cotton and antiseptic gauze in which a hole has been cut for the penis is now applied and the whole secured by a three-tailed bandage secured at the waist. A light diet should be advised, and no attempt made to move the bowels for four or five days. When a movement does occur, the parts should be carefully supported and a bedpan used.

The sutures should not be removed for six or seven days or gaping will quite likely occur. So extreme is the tension when the operation is properly performed that gaping is quite frequent. The drainage tube should be removed in three or four days. The silver pins, or wire sutures, as the case may be, can be allowed to remain for several days longer if necessary. An excellent plan, where gaping occurs, is the application of stout mole-skin plaster on either side of the wound; through the edges of the plaster holes are punched and the two strips laced together with a stout silk or hempen thread, shoe-string fashion. The strips of plaster should extend well out to the thighs. Although a speedy union is desirable as lessening the liability to inflammatory complications and enabling the patient to get about soon, gaping of the wound has some compensatory advantages. The cases which heal by granulation yield a firmer support to the varix from cicatricial contraction and inflammatory thickening. This was well illustrated by one of my cases in which erysipelas occurred.

The patient may be allowed to get up in two weeks, if no complications arise.

My operations for varicocele now comprise forty-five cases of all methods, twelve of which have been subcutaneous deligations of the veins, eighteen of simple resection of the scrotum, four of resection of the scrotum with ligation of the veins at several points, one of open deligation with resection of the veins, one of open deligation without resection of veins,

FIG. 18.



Application of King's Clamp.

and nine of ligation of the veins high up with resection of the scrotum. A recital of these cases in detail would be monotonous; hence I will give only the points of interest developed by their study. I have had no deaths and but few cases in which there was serious reason for alarm. In some few instances, however, there were certain features which caused me considerable uneasiness for a time.

The youngest patient operated on was eighteen and the

oldest forty years of age. Most of the patients were between twenty and thirty. The duration of the affection varied, according to the patients' statements, from one to twenty years. The question of duration, however, is not of importance, nor can it be arbitrarily settled in any case. The duration of varicocele is necessarily a relative matter, and implies the period since the condition was first brought to the patient's attention. Obviously the sexual hypochondriac who proverbially seeks for what he does not wish to find, is likely to discover the tumor earlier than one in whom the sexual functions are not a matter of especial concern. Patients with neuralgic manifestations, referable to the cord, testes or penis, are apt to discover their varix at an early period.

The causes of varicocele, as suggested by my cases, are also difficult to outline arbitrarily. Masturbation and sexual excesses are the causes which are usually assigned for varicocele. Often, however, sexual excesses do not appear to be sufficient *per se* to account for varicocele, but no other cause is discoverable. It is certain that only a small percentage of masturbators have varicocele. As, however, nearly all boys masturbate. it is safe to say that about all subjects of varicocele have; hence the *post hoc ergo propter hoc* argument is quite natural. I believe that I am safe in saying that sexual abuse alone never causes varicocele, and that it is an effective cause in direct proportion as it is associated with some constitutional fault involving vaso-motor perturbation and laxity of tissue, with especial reference to the venous walls.

As illustrative of the important relation of general vascular atonicity to varicocele, one of my cases already mentioned is certainly striking. This case was under the charge of Dr. S. V. Clevenger, one of our leading neurologists, who was treating him for epilepsy. The doctor observed scrotal hæmidrosis, and referred the patient to me as a curiosity. On examination I found a large varicocele, which the patient claimed was causing him great annoyance by its

weight, and the consequent dragging upon the cord and back-ache. On inquiry I elicited the fact that he was exceedingly hypochondriacal. A peculiar feature of the case was the fact that the seminal emissions, like the sudoriparous secretion of the scrotum, was heavily tinged with blood. Urethrametry revealed several strictures in the penile urethra.

As the epileptic attacks were infrequent and had developed since the acquirement of the strictures—and the patient claimed since the development of the varicocele—it was thought advisable to operate. As I considered the hemorrhagic secretions to be a fair warning of the danger of hemorrhage, I ligated the varix subcutaneously, and at the same time performed a dilating urethrotomy. As I anticipated, a terrific hemorrhage from the urethra resulted. The bleeding continued for three days and necessitated the constant presence of an attendant who applied pressure by an ice-bag during that time. There was considerable induration of the veins and a sharp orchitis following the ligature. The result, however, has been excellent so far. The epileptic attack which was expected at the time of the operation has been postponed for nearly four months. I do not say that this fact is proof of the causal relation of the stricture and the varicocele to the epilepsy. Time may show this, however. Like many operations upon the skull for epilepsy, the result in this case may be due to a temporary revulsive effect upon the nervous mechanism, which has merely postponed the usual explosion. I will state, however, that the patient's general health is much better, and that he has markedly increased in weight.

Several of my cases have apparently followed an epididymitis or traumatism. In how far these causes were responsible for the varix in these cases, I am unable to say. Very often the only relation between epididymitis or injury and varicocele, is the fact that the latter has been first discovered after these accidents. Personally, I think that

either of these causes may be operative. I have had one case of varicocele undoubtedly due to athletic strain. All authors, I believe, admit the possibility of a kick producing varicocele. In several instances I have had patients with small varicoceles who happened to be under observation, whose varices increased after an attack of epididymitis. Anything which will impair the tone of the involved part, or induce circulatory obstruction, should be operative in producing or at least aggravating varicocele.

I have operated on two jockeys, each of whom attributed his varicocele to excessive horseback-riding; in one case the patient recalled an injury in springing into the saddle. There is no question in my mind as to the causal influence of excessive horseback-riding in producing varicocele. All old cavalrymen will support this opinion. The records of the pension office afford abundant proof. Dr. James A. Lydston, who has been connected with the pension bureau for some years, informs me that varicocele is one of the most frequent disabilities presented to the attention of the department, and that it is especially prevalent among those who served in the cavalry. How important the appearance of two jockeys, in this connection, I cannot say; it may have been a coincidence, as I am unable to state that the prevalence of varicocele among jockeys is a matter of comment. Other things being equal, they would be less likely than other riders to injure themselves, as they ride on plain saddles, and they cannot therefore experience the disagreeable effects of a blow with a pommel. Jockeys, as a class, are young, healthy, light-weight subjects who are well-kept, and not subject to vascular debility.

The symptoms for which the patients upon whom I have operated, have sought relief, have varied. In several instances the principal annoyance complained of was the deformity. One of my patients, for example, was annoyed by the frequent comments which were made upon his appearance, his varicocele being so bulky as to be quite

prominent even when his trousers were amply large. There was no other symptom in his case which was of any particular moment.

In several other cases there was noticeable deformity, but associated with it were sexual hypochondriasis and various reflex disturbances. In some instances mechanical discomfort has been chiefly complained of. In several cases intertrigo, and in one instance severe chronic eczema, constituted the chief source of annoyance. Pain in the back, shooting pains along the cord and penis, and neuralgia of the testes have been frequent. In some cases irritability of the bladder has been complained of. In nearly all instances sexual hypochondriasis, with or without spermatorrhœa, has been pronounced. I do not wish to be understood as asserting that all of the symptoms for which the patients sought relief were necessarily dependent upon the varicocele. The nocturnal pollutions, spermatorrhœa and prostatorrhœa, might have been due in many of my cases not to the varix *per se*, but to the same underlying cause as the varix. In several instances the principal symptoms were not removed by the operation.

In but one case have I had sufficient hemorrhage to give rise to any particular annoyance. In this case there was a tendency to hemophilia. This, with my failure to use a drainage tube, resulted in a concealed hemorrhage, the formation of a clot, and after removal of the latter, free passage oozing for some days. In this case there was the most extensive ecchymosis that I have ever seen, the tissues from the umbilicus down to the middle of the thighs being as black as extravasated blood could make them. The result, although alarming in appearance, was not a matter of concern, but the patient became very much frightened at what was apparently, as he expressed it, a general mortification. A tendency to ecchymosis exists in all cases of operation for varicocele, and this should be remembered, else both surgeon and patient are apt to be demoralized by the consequent

appearance of the parts. In several other instances there has been a tendency to oozing for some days, thus precluding the possibility of primary union.

The use of the drainage tube is, in my estimation, one of the most valuable points in all operations involving resection of the scrotum. Concealed hemorrhage, tension and sepsis are not liable to occur when the tube is used; there is unquestionably danger of these accidents without it. As long as marked oozing persists, the tube should be allowed to remain. Should severe hemorrhage occur after the operation has been completed, the tube facilitates hot water irrigation or the application of styptics, the former being the best hæmostatic.

The healing of the wound in a fair proportion of my cases of resection of the scrotum has been by first intention: but I have found that there is in many cases a tendency to gaping, even though the sutures be allowed to remain for a week or more. Indeed, I am inclined to believe that when there is no tendency to gaping, hardly enough scrotum has been removed. The gaping is always due to the extreme tension upon the parts incident to a thorough operation. It may be prevented in many cases by allowing the sutures to remain in for some little time. If juniperized silk and silver-wire be used, as I have suggested, the stitches can be allowed to remain in from five to eight days with impunity.

In several instances I have had slight sloughing of the scrotum, evidently from extreme tension. In these cases, however, the result has been even better than those in which primary union occurred. No matter how much tissue may slough, the parts become covered in by an excellent scrotum with almost marvelous rapidity. Although the fit is decidedly snug at first, the testes soon accommodate themselves to their new investment. I have never seen a more delighted patient than one of mine in whom cellulitis occurred as a consequence of infection after operation.

I recall a case of cellulitis of the scrotum, not, how-

ever, following operation, that occurred some years ago in the New York Charity Hospital, in which the testes were bared completely, yet by judicious strapping and occasional stimulation of the granulations a good scrotum was finally secured. I saw several other cases of scrotal cellulitis in the New York State Emigration Hospital during my term of service in that institution. Contrary to the rule in such cases, none of these died. In all there was extensive sloughing of the scrotum, but repair once begun was very rapid. Such cases teach us that in resection of the scrotum there should be little fear of excising too much tissue. The more excised the better the result; and while it is always desirable to obtain primary union where possible, I feel justified in saying that the more gaping, the better the result. Cellulitis, *i. e.* erysipelas, is not a source of danger in resection of the scrotum unless direct infection occurs. This was the explanation in one of my hospital cases, which I have already mentioned. The failure of the wound to unite promptly is undoubtedly, in some cases of scrotal resection, due in a measure to the prolonged pressure of the clamp. Sloughing may be partially explained in this manner. As I have already remarked, my faith in resection of the scrotum as a radical cure for varicocele has been somewhat shaken by several of my cases.

In one instance already related, I have had an opportunity to watch the gentleman for nine years since the operation, and although I removed all the tissue necessary to an ideal operation in this case, the varix, which was a very large one, has recurred, and is now nearly as large as ever. The symptoms, however, for which he sought relief, have not returned. In two other cases there has been a moderate recurrence. The objection may be urged that I have not taken off enough scrotum. My conscience is clear upon this point, however, as I have invariably taken off all I could in reason and still retain a covering for the testes.

My operations of subcutaneous deligations have been

successful, but on the average have given me more uneasiness and trouble than those in which I performed the open operation. In one case recently examined there has been a moderate recurrence two years after subcutaneous deligation. Induration, pain and orchitis are some of the disagreeable features which I have experienced from this method of operation. I have found that the operation of tying the veins low down is much more objectionable from this standpoint than that involving ligation higher up as in the combined operation which I have recommended. It is obviously safer to ligate the veins at their comparatively straight portion, where the changes in the vascular walls are at a minimum, and there is the least necessity for mauling about the investments of the testes and tearing up the planes of areolar tissue. I have already given my reasons for advocating the combined operation. In one of my cases of combined operation, I ligated the vessels at several points rather low down. This patient did fairly well for two weeks, when he arose against orders, or rather over-exerted himself when allowed to sit up. As a consequence, phlebitis, cellulitis and consequent slight suppuration developed. During convalescence this patient developed severe *la grippe* with marked pulmonary symptoms, hæmoptysis being profuse, giving me great apprehensions of pyæmia with embolic pneumonia, etc. Although never very strong-lunged, this patient perfectly recovered.

In four or five cases stricture existed and urethrotomy was performed simultaneously with the operation for varix. I can see no objection to this procedure, and I have had but one case in which the operation upon the urethra afforded any complication. This instance, already alluded to, was one in which severe urethral hemorrhage resulted.

Two cases have come under my observation which suggested the possible development of hydrocele as a result of operation for varicocele. In one of these cases, operated on by me several years ago by subcutaneous deligation, I again

operated, a short time since, for an encysted hydrocele upon the same side. In another instance I operated for hydrocele in a case in which subcutaneous deligation had been previously performed for varicocele of the same side by another practitioner. The patient was complaining of the same symptoms, according to his statement, that had characterized the original varicocele. My operation for hydrocele, although perfectly successful *per se*, has not relieved the symptoms from which he was suffering. He is now giving me a great deal of annoyance by his complaints of severe neuralgia of the testicles. The irritation of sunken sutures which had accidentally traversed the tunica vaginalis, or obstructed venous circulation, plus irritation, might account for these cases. In ligating low down the tunica vaginalis is apt to be quite roughly handled, if not actually traversed by the ligature. Acute hydrocele is a very frequent element in the swelling resulting from ligature of the varix. As already remarked, the testis itself may be involved. Injury of the fascial envelopments of the cord high up is not important, and is a necessary factor in the operation which I have suggested.

I have never performed an operation for double varicocele. Indeed, I have met with no case which, to my mind, required such operation. Even though a case of double varicocele should apparently require a double operation, I should hesitate to incur the risk of atrophy of both testes, slight though I believe it to be. In ordinary single operations the risk of atrophy is doubtless overrated. This is probably due to (1) the relative appearance of shrinkage incidental to the subtraction of the swelling of the varix *per se*. (2) Continuation of atrophy, which was steadily progressing prior to operation. (3) Atrophy due to embolism, syphilis, epididymitis, etc. Theoretical considerations, however, do not always mollify the patient where actual atrophy of the testes occurs. It will be remembered that Delpech was assassinated by a man upon whom he had performed a

double deligation for varicocele some years before. On autopsy the murderer's testes were found to be soft and shrunken, presumably from the operation.

I have had no case in which atrophy of the testes has followed an operation, and have had several both of scrotal resection and ligation of the veins, in which the testes became firmer and larger after the operation. Among my cases was one of scrotal hæmatocele, resulting from the injury of a large varicocele. In this case suppuration occurred, and I was obliged to lay the part open; as soon as it was healthily granulating, I removed the pendulous scrotum with an excellent result. While I have not been able to follow all of my cases for a great length of time, the immediate results have been eminently satisfactory, and in those cases which I have been able to follow for a period of several years, I have no occasion to regret the operation. In the majority of instances the relief obtained has been so marked that the patients were greatly delighted. That this has always been a physical result of the operation I do not claim, nor do I think that under the circumstances it is a question of great importance.

In general I have found that the combined operation of high ligation of the veins, with resection, has been much better from the standpoint of economy of time, than the subcutaneous or ordinary open operations of ligation. Painful induration and swelling of the testes, with consequent disability and impeded locomotion, are very frequent in my experience, when these operations of deligation have been performed.

In nearly all of my cases, there has been a marked improvement in the patient's mental condition. Hypochondriasis has been relieved, and sexual vigor improved or restored. Pain has been relieved in most instances. A notable exception is the case already mentioned, in which hydrocele followed an operation for varicocele, and severe pain persisted after cure of the hydrocele.

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